RAILROAD GAZETTE

FRIDAY, AUGUST 14.

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Contributions.

Concerning Argentine Affairs.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In a recent magazine article on the railroad systems of South America occurred a statement at variance with the opinions prevalent in this country, but which the events of the past week have begun to confirm in a quite remarkable manner. The statement referred to was as follows:

"The Argentine system of railroads constitutes the most important step toward the development of South America as a whole which has yet been taken. Its chief value lies in the fact that it was natural, necessary, and instead of reaching the limits of its growth it has stimulated a more intense vitality. This is all quite apart from the financial embarrassments which have overtaken the republic. The disposition to overreach a normal activity was only a natural result of the phenomenal successes previously attained. Production and traffic are more likely to increase than diminish in consequence of the money panic, and an extension of the paying lines of railroad is certain."

When this was written the tone of newspaper comment and the sentiment of business men gave no hopes of an immediate revival of Argentine commerce. On Aug. 5, however, news came from London of a considerable rise in all Argentine and Uruguayan securities, ranging from two per cent. in the government issues to as much as 10 per cent. in some of the railroad issues. The improvement was said to be due to advices from Buenos Ayres that the bill introduced in the Senate by the government, authorizing a provisional issue of $50,000,000 paper money for the purpose of establishing a bank to undertake the liquidation of the affairs of the National Bank, had been reported upon favorably by the committee to which the matter had been referred. Much as might be hoped from such a plan for the re-establishment of credit, we should be at a loss to explain so favorable a turn in the market upon this alone, especially at this stage of the proceedings.

The basis of confidence may be found more properly in the circumstance that on the day previous a very substantial shipment of gold was made to Argentine from Europe in settlement of a trade balance. This fact lets in a great deal of light upon the condition of the country, and would seem to give some assurance that there are forces within the republic which may be expected to effectually right the evils of the recent financial catastrophe to the nation. Such a commercial earthquake may prove of immense benefit to Argentine in the end. It will result in bringing wiser men to the helm of affairs, and it will cause the Argentines to put their shoulders to the wheel as they have never done before, producing a wealth which is genuine, and not the mere fiction of speculative enterprises. * * *

[We share our correspondent's belief in the physical resources of the Argentine Republic, and his hopes for its recovery; but one swallow does not make a summer, and a nation in which public opinion and official conduct are so debauched does not fill us with much faith. We fear that it has a good deal to learn yet.—EDITOR RAILROAD GAZETTE.]

Faults of Short Radius Bars.

READING, Pa., July 27, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your last issue I notice a criticism by Mr. Sanderson, of the Norfolk & Western, on the length of radius bars, and your comments thereon.

We have had considerable experience in that direction ourselves in connection with our mountain consolidation engines, which have cylinders 22 in. × 28 in., 72-in. boilers, 50-in. wheels, and weigh in working condition 75 tons. We use these engines on grades varying from 90 ft. to 175 ft. per mile, and on track where tangents are few and far between.

The engines were built at the Baldwin Locomotive Works and originally had radius bars 52 in. long, *i. e.*, the distance from centre of truck to centre of radius bar pin was 52 in. We were obliged to shop these engines short of a year's service on account of sharp flanges, not only as to the truck wheel and leading driver flanges, but also as to trailing driver flanges. This latter wear was due to engine running as much backward as ahead, as the engines always push up the grade head on and are never turned.

I was always a doubting Thomas regarding the long-time idea of many locomotive builders that the length of radius bar was a condition as to curvature, the length of which was to be guessed at. In 1887 I developed a formula for length of radius bar, a copy of which I inclose; a similar formula was published in your paper recently (see *Railroad Gazette*, Feb. 7, 1890, p. 85). This formula, applied to the conditions as to wheel base of the consolidation engine above mentioned, gave a length for radius bar of 72 in., while the actual length of bar on engine was, as stated, 52 in., or 20 in. shorter than it should be according to calculation. We altered the length of bar on one of these engines nearly two years ago to 69 in.; this length was given to the bar in order to utilize frame bolts already in position in frames; this made the bar 3 in. shorter than it should be theoretically. The change in length gave such good results as to flange wear that the engine has not been to the shop since. We have changed the bars on five other engines of the same class which have now been running for some time with satisfactory results; we shall change the balance as fast as they come to the shop.

The change in length of radius bar not only corrected the flange wear of the truck wheels and leading drivers when running ahead, but also corrected the wear on trailing drivers when running backward. In other words, the corrected radius bar made a wheel base of engine that was always tangential to curve as far as possible under condition of length of rigid wheel base. Our experiments here have shown such gratifying results as to thoroughly convince me that there is but one *proper* length for radius bar, and that length is the *geometrical* or *calculated* length.

SAM'L P. PRINCE, Jr., Mechanical Engineer.

[The evidence from actual service which has been sent to us lately would seem to be sufficient to settle this much-prolonged discussion of the proper length of radius bars for two-wheel trucks. This evidence is from careful observers, who have recorded, not what they were looking for, but what was actually seen. The result of the discussion thus far is a satisfactory proof that the geometrical length is the correct one. For those who desire to look up the record of this discussion, we append the following list of references to the *Railroad Gazette*: Feb. 7, 1890, page 85; Aug. 22, 1890, page 586; Sept. 5, 1890, page 618; Feb. 13, 1891, page 115; May 15, 1891, page 336; July 24, 1891, page 507.—EDITOR RAILROAD GAZETTE.]

Notes on the New York, New Haven & Hartford.

This company, which began four-tracking its New York Division three or four years ago, is still engaged on important improvements at various points on its line. Much of the work is quite difficult in detail on account of the necessity of keeping out of the way of the large traffic constantly moving, and at many points the progress is necessarily slow on account of the blasting that has to be done. This road was compelled originally to fight its way through the rocks of Connecticut as the Puritans fought for planting and grazing ground through the rocks of the rest of New England, and the present widening involves a repetition of the contest of 1844-49.

SHORE LINE DIVISION.

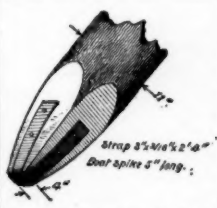
This division, 51 miles long and now the only single track section in the Shore Line route between New York and Boston, is rapidly being put in a condition which will enable it to do its part toward running trains between New York and Boston in 5½ hours instead of six, the present schedule of the fastest trains. (This is on the basis of the locomotives now used and trains of the same weight. The engines, however, are not heavy, and with slightly larger ones, or with four-car trains faster time could easily be made now.) The principal drawbacks now are occasioned by the temporary changes in tracks and switches. The second track, which was begun last year, is now completed between Guilford and Niantic, 28 miles, and two tracks are here in use. This will soon be increased about 10 miles by the completion of the second track from Niantic eastward to New London and westward from Guilford to Leete's Island, thus leaving only one-fourth of the division of single track.

This 28-mile section was the easiest part of the road to widen. There are many fills and cuts, but they are nearly all small and the streams to be bridged were also mostly small. Seven highways have been carried under and ten have been carried over the railroad by iron bridges, all of which are plate girders. The girders are from 26 to 60 in. in height and form a parapet, which is surmounted by a railing of very neat and ornamental design. The grade of the railroad has been improved at all points where necessary, a number of sags being taken out, and the maximum grade is now 30 ft. per mile. The reconstructed line is all ballasted with a very good quality of gravel, which is plentiful at several points. The rails used weigh 74 lbs. per yard. The extension of the second track from Guilford westward is delayed by the difficulty in filling in a pile trestle. The inlets along the line here are all tidal streams and the mud is of considerable depth. At one place it bulged up along side a fill in such a manner as to suggest the presence of a "sink hole" and the roadbed was endangered; so that to obviate all uncertainty as to the passage of trains, the main track has been removed to a temporary trestle built around the site of the old trestle on a 12-degree curve.

The seven-mile section between Niantic and New London, which is now nearing completion, has been the most difficult one in the whole work. The new track on the new grade is now in use as a single track for most of the way, but there are several rock cuts and several important under bridges for highways. There are three highways carried over and four under the tracks. And the construction of two drawbridges, one at Niantic and one at Shaw's Cove, close to the New London terminus, will cost about as much as the whole of the rest of the work on this section. Moreover, these bridges have to be erected and maintained for the benefit of an amount of water traffic which is so small as to seem contemptible in comparison with the expense and care imposed upon the railroad. At Niantic there are three landings for coal boats, and the whole area of Shaw's Cove is hardly large enough for a good sized vessel to turn around in.

The existing line at Niantic consists of a long curve skirting the shore of Long Island Sound, the Niantic River being crossed about midway by a trestle and a light wooden drawbridge. For the double track a new line has been constructed by filling in rock and earth for about half a mile along side of the old line, crossing Niantic River some 300 ft. further from shore. Across the main channel there is a plate girder bridge 523.6 ft. long, consisting of five fixed spans, each 76 ft. 6 in., and a draw span 140 ft. 10 in. The rails of the track are 17 ft. above high tide, and the ties supporting them rest directly on the girders, which are 6 ft. apart from centre to centre. These girders are 7 ft. 2 in. in depth. The piers and abutments are of cut granite from the quarries at Leete's Island.

The current in this stream is often quite strong and rapid, and it was decided to put in broken stone for the foundation of the west abutment and two of the piers immediately after the dredging was done and before the piles were driven. Rip-rap 8 ft. in depth was put in as soon as possible, and piles were then driven through the stone and from 16 to 23 ft. into the ground below to hard bottom. The ends of the piles were sharpened to a section 4×4 in., and protected by iron straps put on at right angles to each other, as shown in the accompanying cut. Piles shod in this manner were driven through 8 ft. of rip-rap into sand bottom. This form of protection cost some 55 cents for each pile, and has proved very successful. The east abutment and two piers were laid on a stone platform made on the tops of the piles, the piles being sawed off below the water. Divers were employed for the necessary submarine work. A coffer-dam was, however, built for the east abutment. The centre pier for the draw, which is 32 ft. in diameter, and three of the other piers were built in open caissons. All parts of the substructure are thoroughly rip-rapped. This bridge will be completed probably within a month.



At Shaw's Cove the work has only just begun. The dredging is done and the caisson for the central pier is about ready for use; and the filling in to take the place of the trestle now used is partially done. Both of these drawbridges being opened very infrequently, will be kept locked and will be moved by hand. Interlocked home and distant signals will, however, be provided.

The bridges are built by the Berlin Iron Bridge Co., of East Berlin, Conn. The contractor for the substructure is John Beattie, of Lette's Island, and for the dredging H. Dubois & Sons, and J. Fraser, of New London. The engineer of the Shore Line Division is Mr. C. M. Ingersoll, Jr., but the bridge work at Niantic and New London is under the immediate charge of Mr. R. M. Berrian.

The staff system, which was introduced last year, is still in use for running trains over the single track between Niantic and new London, but the trainmen do not seem to be very enthusiastic over its merits. The section is too long and has too many fast trains to be operated in this way.

NEW YORK DIVISION.

This division, besides its enormous passenger traffic, has a considerable freight traffic between New Haven and Harlem River station, at 132d street, New York City. The Harlem River branch joins the main line at New Rochelle, and eastward from that place to Portchester, nine miles, four main tracks are now in use. The principal new work going on begins at East Norwalk, 17 miles further east, and extends from there about 12 miles eastward, to within a mile of Bridgeport. The work here is somewhat easier than that heretofore done west of Portchester, though there is a good deal of rock cutting. The grade has been changed comparatively little. The principal feature of the expense has been the erection of overhead bridges

and changing of highway grades. Seven overhead bridges have been built and twelve bridges for carrying the railroad above highways. Where new passenger houses have been necessary on this section they have been built of wood, and the roofs over the platforms are wholly of wood, though the design is similar to that of the roofs built by the Berlin Iron Bridge Co. with trussed iron frames and iron posts. At Fairfield, where a street crossed immediately adjoining the passenger station, an overhead bridge has been built to span not only the tracks, but a wide approach to the station. On both sides of the four tracks there are three spans, the central piers adjoining the tracks on either side. By this means a change in the location of the street, which would have been very costly, was avoided, while, at the same time, the new construction obviates the necessity of an unsightly earth embankment very close to the passenger station. The new rails laid here weigh 74 lbs. per yard, and this 12-mile section will be ready for use this fall. All four of the tracks are ballasted with broken stone, which is quarried close to the line at Fairfield.

On the completion of this improvement the road will be prepared to handle its freight traffic expeditiously all the way from New York to Bridgeport, as, by the aid of the block system, which abolishes the old 10-minute space rule, freight trains can be run over the intervening two-track section between passenger trains, which are forty minutes apart, and in favorable conditions even less. The peculiar feature of an overhead bridge where the construction of an earth embankment with retaining walls would seem the ordinary course, is also observable at Rye, on the older four-track section. At this point the new line is about 100 ft. north of the old, and both new and old had to be cut through solid rock, but the old tracks have to be left in position and an overhead bridge, which consists of three spans 75 ft. each, extends over both.

The four-track road will terminate west of Bridgeport for some time, as the line through that city will be a costly one to change. It will be remembered that there has been a good deal of legal controversy between this road and the Housatonic, which finally resulted in an exchange of properties between the companies, whereby the old passenger station came into the possession of the Housatonic, so that the passengers now have to cross the tracks of that road to reach the old passenger station, although in the exchange this company reserved the right to use the station until it provided itself with a new one. The need of improvement is pressing, but the cost is great and the road seems at present to be waiting for the city to define its position. Chief Engineer Curtis has had careful estimates made of the cost of a new line, above grade, on about the present location, and also of a line around the north side of the city, which would obviate the necessity of a drawbridge and perhaps save something in the cost of real estate; but either one of these lines will probably cost from $1,500,000 to $2,000,000. There are, however, at present 21 grade crossings within the limits of Bridgeport, many of which have to be watched night and day. The wages of these watchmen probably represent a capitalization of more than a quarter of a million, not to mention the expense of electric bells, repairs of gates and damages to persons injured.

Besides the work above mentioned there is a large job of blasting and grading going on at Portchester, the eastern terminus of the existing four-track line, for a new station, and two under bridges for streets. The line here is to be changed and the work will take several months, but it will result in the extension of the four track section but a very short distance. Another feature worth mentioning is an iron, truss, through bridge (overhead) for foot passengers at the station at New Rochelle. The bridge has a span of about 72 ft. and rests on rectangular towers, the station, which is on the north side, being some 40 ft. back from the track. The south end of the bridge is on a level with a street, thus affording a convenient approach for a portion of the passengers who use the station. While there is nothing novel in the bridge itself, it affords an example of a "safety appliance" which should be more common on American roads, especially four-track lines. The floor of the New Rochelle station is about 4 ft. above the platform, but the wooden stairways constituting the approaches to the bridge are too steep. This and all the others stations on the four-track line have fences separating the two inner from the two outer tracks. At the other stations passengers have to cross on the track level, a stationman keeping the gates in the fences locked when necessary, but most of these stations have a highway crossing either above or below grade which is much nearer the station than are the street bridges at New Rochelle.

On the Harlem River Branch a new passenger station has been built at the southern terminus, where connection is made with the Suburban Rapid Transit line, which in turn connects with the Manhattan elevated lines at One Hundred and Twenty-ninth street. The contractors for the building were Norcross Brothers, of Worcester, Mass. The location of this station was shown on a map printed in the *Railroad Gazette* July 24. The building is of brick, two stories high, 300 × 30 ft. It stands on uneven ground and the west end has a commodious basement, the walls of which are faced with cut stone. The building will be heated by steam, brought from the boilers used for the round house and repair shop, 1,100 ft. away, by a 6 in. pipe. The pipe is laid in a subway 3 × 3 ft. walled with brick, and there is a 3-in. pipe for the return of the water of condensation, the boilers being several feet lower than the station. This station has to handle large numbers of passengers on the occasion of the Morris Park races, and the platforms are about 800 ft. long. There are three tracks immediately in front of the station, then an intermediate platform with fences and ticket collectors' lobbies, then three more tracks and another platform on the further side. The platforms are covered with sheds supported by longitudinal iron trusses resting on posts, made by the Berlin Iron Bridge Co., on a plan familiar to our readers.

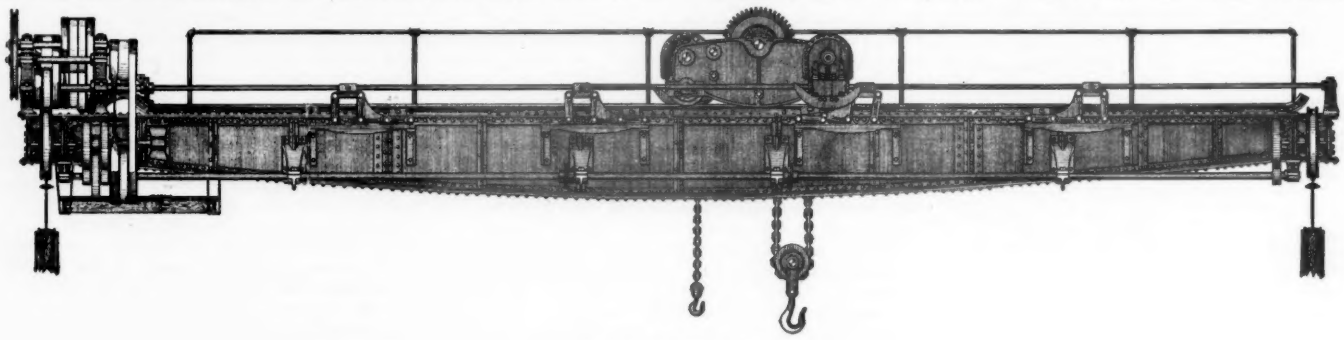


Fig. 1—Traveling Crane.

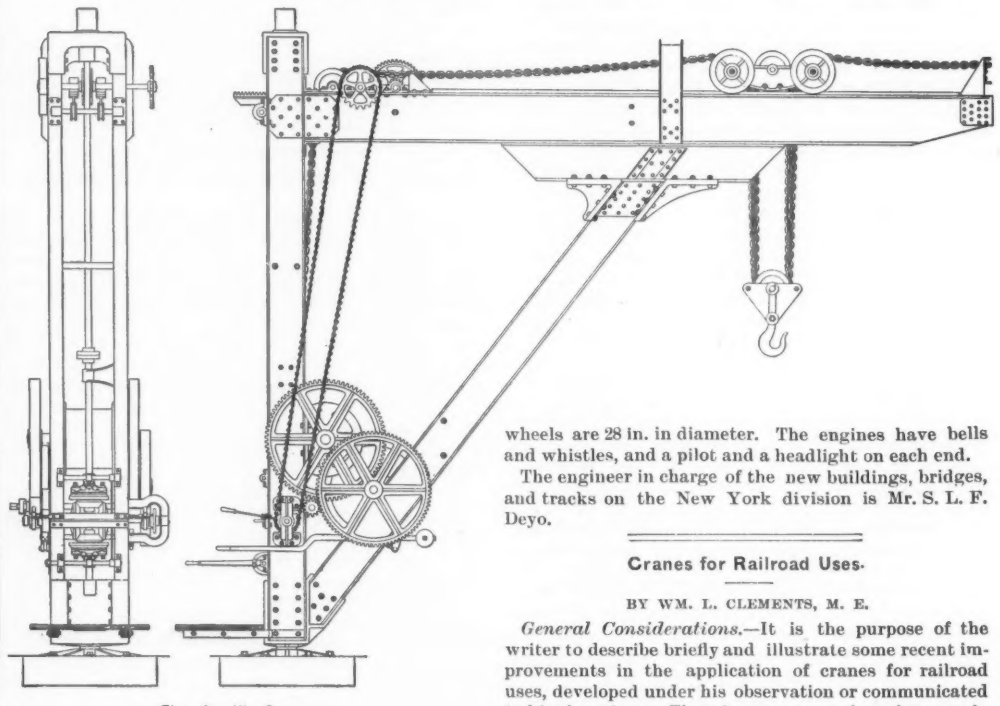


Fig. 2—Jib Crane.

On a recent race day 11,000 passengers were sent out from the Harlem River station in two hours. This station was put in service on Aug. 1, although it is not yet finished, and on that day the new Suburban service between New Rochelle and 129th street was begun, trains running each way at intervals of one hour, except in the morning and evening, when the interval is 30 minutes. The cars used are, as heretofore stated, similar to those of the Manhattan elevated, with minor exceptions. The platforms are provided with steps, so as to make ingress and egress convenient on an ordinary surface road, but when a train enters the elevated road's tracks where the station platforms are high the platforms are extended to the gates at the outer edge of the car by letting down a hinged piece which before was fastened up against the end of the car body. This "lid" is held home in the open position by a catch connected with the gate, and in the closed position by a spiral spring.

Inside the cars there is a package rack on each side, the whole length, and there is a supply of drinking-water in each. The receptacles for this water, which are similar to those lately placed in all the cars of this road, are of galvanized iron, 8 in. in diameter and 30 in. high. They are grained a light color and are fastened to the wall of the car by two brackets, which drop into tapered grooves in brass lugs, fastened to the woodwork. A peculiar feature of these cans is the placing of the faucet at the extreme lower point, the bottom being cup-shaped, so that there is no chance for sediment to collect inside. There may be some question whether each drinker will in every case draw out precisely his own proportion of sediment, but there can be little doubt that all of it must be let out by somebody. Four-car trains are run, the car at one end having a small compartment for baggage, separated by a partition, the upper half of which consists of a coarse wire screen, and the seated portion being used as a smoking car.

The cars have Krupp steel spoke wheels and iron trucks. The vacuum brake is used, the same as on the elevated road, and likewise the Gold steam heating system. The most prominent lettering on the cars is "SUBURBAN SERVICE," which suggests the title to the boy's picture—"This is a horse." "N. Y., N. H. & H." appears beneath the windows.

The locomotives hauling these trains are of the Forney type, weighing 35 tons, and were built by the Rhode Island Locomotive Works. The driving wheels are 4 ft. in diameter, and the driving wheel base 6 ft. The truck wheels are 28 in. in diameter. The engines have bells and whistles, and a pilot and a headlight on each end.

The engineer in charge of the new buildings, bridges, and tracks on the New York division is Mr. S. L. F. Deyo.

Cranes for Railroad Uses.

BY WM. L. CLEMENTS, M. E.

General Considerations.—It is the purpose of the writer to describe briefly and illustrate some recent improvements in the application of cranes for railroad uses, developed under his observation or communicated to him by others. These improvements have been made in the lifting and transferring appliances of the repair and construction shop, also in the appliances for the maintenance of way; and methods of transmission of power to crane machinery have been made which are new and which are interesting and important to consider. The development of powerful railroad cranes has been a result of changes in the weight and capacity of railroad equipment during the past few years. Something more powerful and economical has been demanded for the maintenance of these changes. Many recent designs are peculiar and applicable to American railroad service, and have been shown only through the medium of advertisements, and that but at random and in a partial manner.

The principles of crane construction and design are unimportant here, as they have been modified but little in recent years. The late work of Ad. Ernst, "Die Hebezeuge," leaves nothing to be desired in theory, and the development of these theories promises in the future practical results, increasing the use and effectiveness of

crane machinery. Until recently the study of cranes in particular has not occupied the attention of American engineers, but competition has demanded labor-saving appliances, and increased volume and dispatch of business with increased weight has made it necessary.

In general it may be stated that the use of labor-saving appliances increases directly with commercial competition, and this involves railroads in the mechanical and pecuniary problem of the minimum expenditure of manual labor with the maximum of work. This maximum of work with minimum of labor has been arranged with more or less correctness by American railroads, but better results are more frequently seen in private commercial enterprise.

Parallel with increase in commercial competition are increased motive power and equipment, always with a minimum of labor. As a consequence, in the modern railroad construction and repair department man's muscular effort is of far less importance than in past years, and the primitive methods must be changed to maintain the minimum of labor; thus lifting and transferring appliances become essential, subsituting for human energy other forms less expensive. With increased equipment come other considerations as to economy of space occupied, track arrangement, rapidity of service involving changes as to the method of assembling parts in the motive power department. Manufacturers of railroad equipment have shown that an economical arrangement as to space, cost of erection and maintenance is a design of constructive appliances which calls for the bodily movement of the complete locomotive. This fact, coupled with the preceding, necessitates the best and most effective design of crane machinery.

The freight-operating department of a railroad has the same problem of maximum of work with minimum of manual labor, and the costs of preparing and handling material for shipment are questions involving modern appliances for such especial service. As to the department controlling track maintenance, new construction, track clearing in case of accidents, the adaptation of cranes has been for like reasons a necessity, and there are on American railroads crane appliances of distinctive design and unlike the productions of other countries of which we have a knowledge.

In track maintenance, practice differs, all agreeing upon one point—that at intervals it is necessary for the preservation of roadway to replace, with labor and machinery, constructive materials. As to whether this is to be done with a large amount of manual labor with miscellaneous hand machinery or as to whether it is to be done by complete expensive first cost machinery, capable of transportation as a car and as a whole, with few skilled attendants, are questions sometimes disputed as to cost of work, but never as to efficiency, celerity and easy management. The lighter the work of maintenance the closer the equality of costs in the two methods. To-day the construction of bridges, abutments, placing of turntables, etc., demand power machinery, and there is no dispute as to the satisfactory method.

It is not the purpose to place any one system of track clearing above others which have been proposed; all agree that the greatest speed is necessary for the non-interference of traffic.

In a system of wrecking it is emphatically true, "That which is well done is best done." However, it is also true that the railroads with the heaviest equipment are provided with the heaviest lifting appliances of their kind, and advocates of the block and hand jack generally have experience with the light equipment. A demand by some railroads for something powerful and portable in construction and wrecking has developed the portable railroad crane.

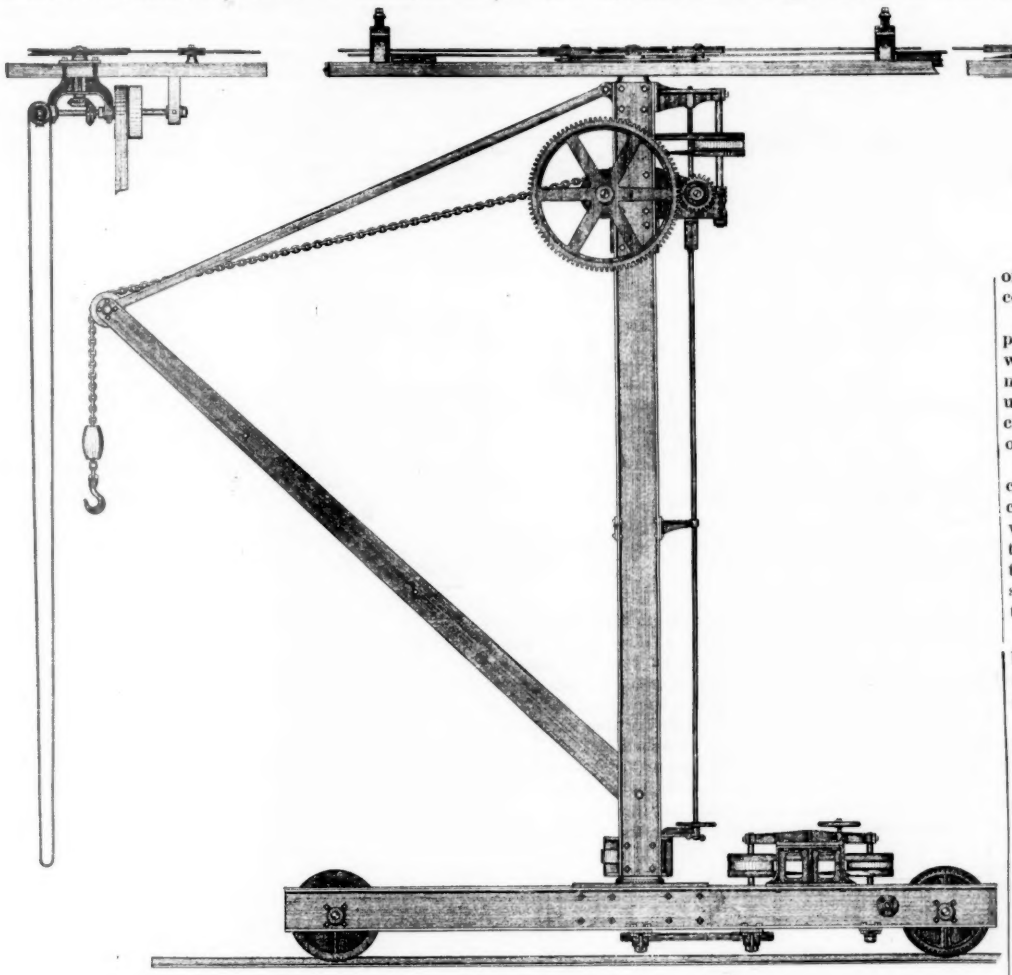


Fig. 3—Walking Jib Crane

Types of Cranes.—As to types of cranes for the motive power, construction and erecting shops, whatever the power, from line shafting, flying rope, electric motor or hand operation, shop work requires and ordinarily uses three types: the overhead traveling, jib and walking cranes. Traveling cranes with single or double trolleys and hooks, used singly or in pairs, are most effective for this work, the single machine of great use in moving and assembling parts. For large and bulky work, as in transferring a locomotive or boiler bodily, cranes with double trolleys, or the combined use of two single machines, are used effectively. In the ordinary American roailroad-shop practice such cranes with capacities and movements are not necessary, the transfer table and the system of many short parallel tracks being used instead; but such arrangements, certainly effective, are quite as expensive as to cost, and the combined system occupies a much larger area than the system of two traveling cranes and long parallel tracks for erection and construction, in the latter case, of course, involving upon completion the transferring of the machine or locomotive by the pair of cranes to the outgoing tracks. Advantages of the last system are: Less shop space is lost, much or all space may be utilized, and the assembling can be done more readily by one of the cranes. This system, now generally recommended, has not received its share of favor in the United States until recently, but is ordinary English practice.

Fig. 1 shows in outline a single-trolley traveling crane used either singly or in pairs for locomotive transferring, and of capacity meeting all ordinary requirements. The motions of either machine necessarily are independent of the other, and power for propulsion is with rope, shaft or electricity. The old and successful systems of propelling these machines by flying rope or shafting are well known. There are advantages of simplicity, but of modern capacity, without high speeds for flying rope; with the shaft there is ample capacity, but loss of power by excessive friction. The expense of maintenance is also greater through deterioration in consequence of complexity in the tumbler bearings.

Experience with electric cranes has now, perhaps, passed the experimental stage. The simplicity with which electric motors may be made to operate the various motions of a crane are strong recommendations for their use in this service, where a minimum amount of machinery is best, both for absorption of power and cost of maintenance.

The use of a jib crane as an accessory to a traveling crane is a common practice, and reaches positions inaccessible for a traveler, and, within the jib's radius, works with effect. With double high-speed engines, for operation, with compressed air or steam as a motive power, the largest capacities are attained. Power from line shafting controlled through friction clutches is satisfactory for cranes of ordinary capacities.

Fig. 2 illustrates a jib crane with power derived from line shafting and of 25 tons capacity. All motions are independent. There are two speeds, for hoisting for light or maximum loads, and power trolley traversing.

A crane eminently suitable for railroad machine shops is the walking jib crane shown in fig. 3. Used for purposes of serving machine tools, with a proper arrangement of these tools its effectiveness surpasses any system of crane work of which we have knowledge excepting the overhead traveler. It may be of service in locations inaccessible to the overhead traveler through the necessity of shafting, coutershafting and belts accompanying machine tools. Generally of moderate capacity but sufficient to transfer any part necessary for machine work, with tools arranged closely upon either side of a single and central rail upon which the machine travels, work can be transferred easily from one machine to another, entirely from the building, or within reach of a traveling crane for use in the erecting shop. Such a machine occupies but little space, and is peculiarly adapted for machine work. The English railroad shop is incomplete without it; in the United States it is used as yet, but rarely. The sketch, fig. 4, shows the combined use of a pair of traveling cranes for locomotive, erection and transfer work, and a walking jib crane for serving tools, the design being modified from English practice, and recently adopted and erected for one of the largest American railroads.

The simplicity and general use of power jib and pillar cranes for shop work call for no special description or explanation. These same types illustrate recent practice for American freight yards when there is power at disposal other than that which can be furnished by yard men.

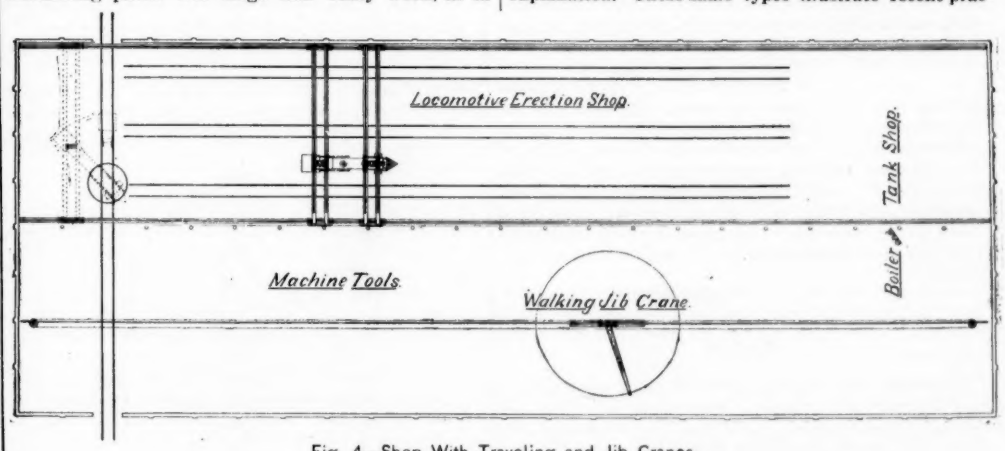


Fig. 4—Shop With Traveling and Jib Cranes.

(TO BE CONTINUED.)

Radial Stay Crown Bar and Belpaire Boilers.

A correspondent writes: "I notice in your columns considerable discussion of the relative merits of the Belpaire and radial stay boilers, and it has occurred to me that if you would publish a statement of the number

of boilers of the three common types that have been built this last year it would furnish some substantial evidence as to the comparative confidence of railroad men in the different designs." We have made some inquiries on these lines and the results follow. The list includes a majority of the locomotives built, but does not include those constructed in railroad shops.

New York Locomotive Works: During the year ending June 1, 1891, the Belpaire boilers were one-sixth of output. The remainder were principally crown bars.

Schenectady Locomotive Works: In the last two years 20 Belpaire boilers and 32 extended wagon top

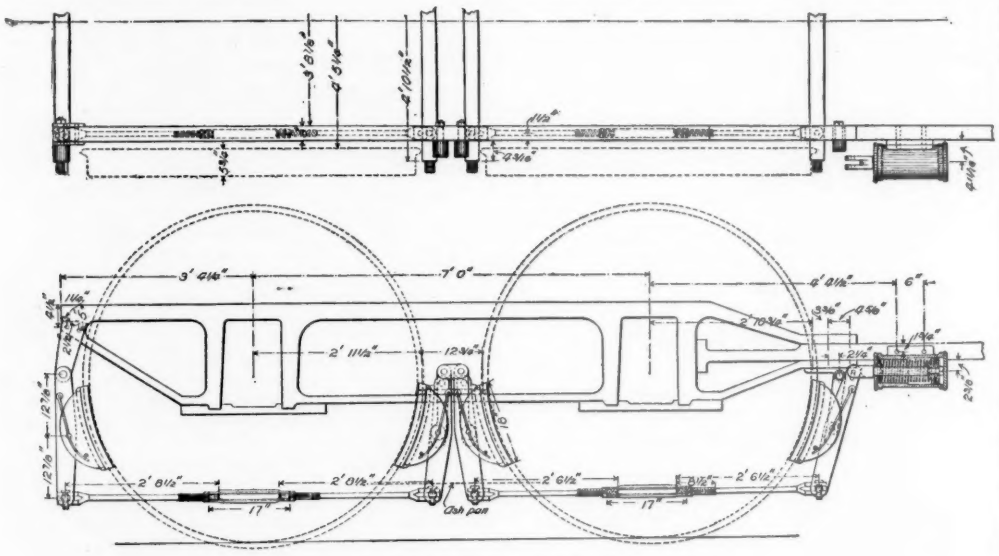


Fig. 1—For Eight-Wheelers.

with radial stays. [The total output for two years was 557 locomotives.—ED.]

Pittsburgh Locomotive & Car Works: In the last fifteen months one Belpaire boiler. The majority of all output has radial stay boilers and the majority of all inquiries for locomotives specify that type.

H. K. Porter & Co.: Fireboxes are of small size and the crown and sides are in one piece, the crown being circular instead of flat, and the crown bars run lengthwise. They have not built any Belpaire fireboxes. For the year ending July 1, they built 99 crown-bar fireboxes, as above, and nine with radial stays.

Portland Co.: For the year ending June 1, 1891, 14 locomotives with crown bar bracing, six Belpaire for rotary snow plows. None with radial stays.

Brooks Locomotive Works: For the year ending June 1, out of all engines built in that time about 94.4 per cent. had crown bars and 6 per cent. had radial stays. No Belpaire boilers.

Rogers Locomotive & Machine Works: During the past year, crown bar boilers 68⅛ per cent., radial stay 16 per cent., Belpaire boilers 15⅛ per cent.

Rhode Island Locomotive Works: During the year ending June 1, 1891, 131 boilers with crown bars, 72 with radial stays, 6 with Belpaire. This is a fair average of the proportion of the different kinds of boilers for the last three or four years.

Cooke Locomotive & Machine Company: During the past year crown bars 60.3 per cent., radial stays 35.8 per cent., Belpaire 3.8 per cent.

Baldwin Locomotive Works: Between June 31, 1890, and May 31, 1891, built 986 locomotives, with boilers constructed as follows: Wagon-top boilers with crown bars, 179; wagon-top boilers with radial stays, 330; straight boilers with radial stays, 344; straight boilers with crown bars, 57; Belpaire boilers, 76. Total, 986.

It is clearly evident that there is a growing confidence in the radial, screwed stay boiler, and that the design meets with general approval. We have yet to record the first instance of one of these boilers exploding because of the inherent weakness of the stays, but there are numbers of cases on record where explosions have occurred as a result of overheated crown sheets, and there would have been explosions in these cases, with probably more disastrous effects, if the boilers had crown bars.

Boyden Driver Brake Gear for Eight-Wheelers and Moguls.

The driver brake rigging shown in figs. 1 and 2 is from new designs by the Boyden Brake Company. Fig. 1 is for an 8-wheel locomotive and fig. 2 is for 6 wheels coupled. The drawings explain themselves and a detailed description is unnecessary.

The aim has been to produce both a pull and a squeeze brake with all the joints and centre of gravity of the parts in approximately the same vertical plane, in order to reduce the wearing of the parts due to the continuous jarring when the engine is in motion and the brakes are not applied. The levers are vertical and the weight is carried on the fulcrumed point, and the sagging, therefore, which is common in some forms of driver brake, is obviated in this design. Duplication is aimed at and as many parts as possible are made from the same pattern and with the same sized holes. The pull-rods are connected with the bell crank by swivel joints made of a steel casting with trunnions, through which passes the pull-rod with double nuts on both sides.

Curvilinear Movements of Locomotive Counterbalances.

During the past year or two we have discussed at considerable length the action of locomotive counterbalancing at high speeds and its effect on the track and the locomotive. But there is one feature which we have not considered as fully as we should like to have done—that of the exact path of the centre of the axle when running at speed—for the reason that it required experimental data to furnish sufficient proof that the path is not that which it is commonly supposed to be. And while even now there is not enough known to enable a conclusion to be reached, yet the following quotation from the *Technograph* giving results reached by S. D. Bawdin under the direction of Prof. Arthur T. Woods, at the University of Illinois, throws some light on the subject.

A driving wheel is essentially an unbalanced body revolving about its geometrical centre, but not about its centre of gravity. The centre of motion is not fixed in position, as it can move vertically against the pressure of the driving spring and downward by a deflection of

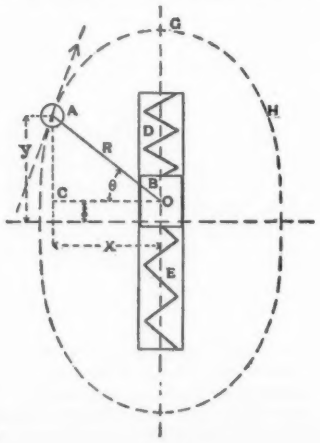


Fig. 1.

the rail. It has been for some time a question whether the greatest pressure on the rail and the greatest lifting tendency was produced exactly at the 90-degree point or at some point later in the revolution. The experiment cited consisted in making a small model which embodied the general principles of action of a locomotive driving wheel and placing the same in a lathe and revolving it at a high speed. The results indicate that the maximum centrifugal pressure, both upward and downward, occurs at a point later than the 90-degree point. The mathematics of this subject are somewhat involved and we have not yet seen a solution which would prove where the maximum centrifugal pressure is produced, but the equations are such as to indicate that when a locomotive driving wheel is running at speed the maximum pressure on the rail does not occur when the centre of the counterbalance is directly below the centre of the axle. This is a good subjecet for some of our bright mathematicians to investigate.

The following is from the *Technograph*, 1890–91:

A running balance is a statical balance, and *vice versa*. With the wheel in statical or running balance, the centre of gravity lies in the axis. With an eccentric load added to the balanced load, the centre of gravity is moved from the axis to some point between the eccentric load and the axis.

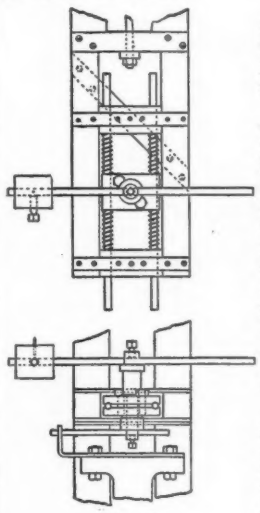


Fig. 2.

An eccentric weight has the same effect in producing centrifugal force, whether acting alone, or placed in a balanced wheel.

Since there is an excess of counterbalance in the wheel of the locomotive, the centre of gravity of the wheel will not lie in the axis, but between the axis and the excess of weight. The centrifugal tendency, then, of the wheel, will be the same, whether we consider the mass of the whole wheel concentrated at the centre of gravity of the wheel or only the excess of counterbalance concentrated at the centre of gravity of that excess of weight.

The locomotive driving wheel is so placed that it can move vertically, either up or down, but in each case there is a resistance to its motion; above, there is the pressure of the weight of the locomotive, transmitted through the driving springs; below, there is the rail. The motion of the wheel may be compared to that of a body revolving about an axis, and free to move vertically, up or down, against resistances. In fig. 1 let

A = centre of gravity of wheel, with mass of wheel concentrated there.

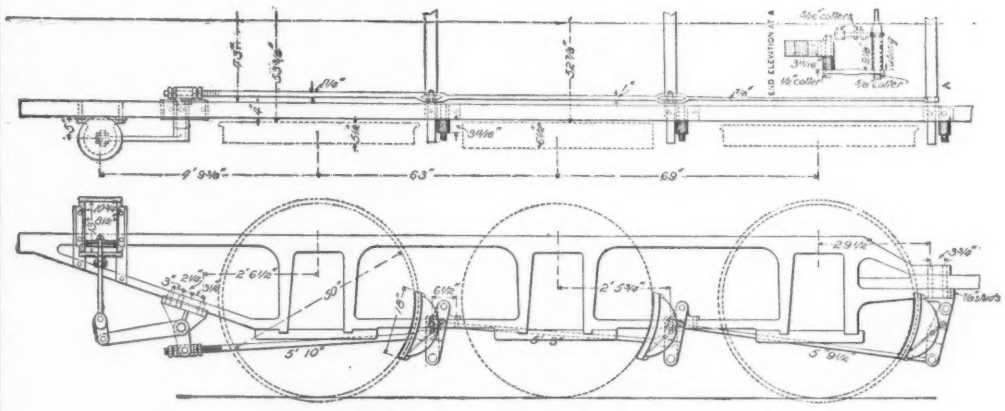


Fig. 2—For Six Wheels Coupled.

BOYDEN DRIVER BRAKE GEAR.

B = axis (free to move vertically against springs D E),

R = radius of centre of gravity of wheel.

In order to simplify the conditions of the problem we will consider that the wheel is revolving at a uniform angular velocity, and also neglect the time that it takes the springs to act.

Let θ = angle made by R, at any moment, with the horizontal; as before, let

F = the centrifugal tendency of the wheel.

This force acts in the direction of the radius R, and, since we assumed that θ grows constantly, and the weight of the wheel is constant, F is a constant force. Then the vertical component of this force is, in all cases,

$$F \sin \theta.$$

If a unit force, or load gives a deflection of the spring = S, then the total deflection at any moment is equal to the total force acting times the unit deflection, or

$$FS \sin \theta.$$

Let this be represented by δ, as shown on the figure, then

$$\delta = FS \sin \theta.$$

The vertical distance of the centre of gravity of the wheel from the horizontal axis equals

$$R \sin \theta + \delta.$$

Referring to the horizontal and vertical axes as co-ordinate axes,

$$y = R \sin \theta \times \delta.$$

Substituting,

$$y = R \sin \theta + FS \sin \delta.$$

In the same way, the horizontal distance of the same point from the vertical axis is

$$x = R \cos \theta.$$

When $\theta = 90°$, the value of $F \sin \theta$ reaches a maximum, and equals F. At that point, then, the greatest deflection of the springs will occur, and will equal FS,

remembering that we assumed that the time of action of the springs is nil.

To judge of the time allowed the springs for action, take a driving wheel 63 inches in diameter. If the locomotive move at the rate of 40 miles per hour, it will go 3,520 ft. per minute. The number of revolutions per minute = 213.4, and each revolution would take .281 sec. But in half a revolution the force has given the deflection a and returned to its normal position, so that the time taken in deflection and recovery is only .1405 seconds.

Unwin defines a suddenly applied load as a load applied to a structure without velocity, but at one instant; and such a load, not exceeding the elastic limit, produces twice the stress of an equal steady load. The case in hand comes under the definition, since, when θ = zero, the deflecting force is zero, and it increases with the revolution. In the locomotive, flat laminated springs are used, so that the formulæ for beams apply, and the deflection under the suddenly applied load is twice that which would occur under a steady load, or $a = a'$, in which a' is the deflection under the same load acting steadily. As the theoretical curve assumed that the springs took no time to act, while we should naturally expect them to influence the movement because of the resistance which they offer, it was determined to investigate their action to some degree.

With this idea in view, a machine as shown in fig. 2 was constructed, having, as in the theoretical machine, a spindle free to move vertically while revolving, although against the resistance of springs.

The machine consists, essentially, of a wooden frame, braced, and clamped rigidly to the bed of a lathe. Through the upper and lower crosspieces two hollow brass rods are fitted to slide vertically. To these rods is clamped a block carrying a spindle, which has at one end a rod which works freely in a slot attached to the face-plate of the lathe; and on the other end another rod, upon which is a weight, which may be fastened at any point, in order to give different radii, and thus different centrifugal forces at the same speed. The machine has proved itself, on the whole, not altogether satisfactory. It was not rigid enough, and for that reason the curves are not as satisfactory as might be desired. The centrifugal force of the weight combined with its leverage on the brass rods tended to bend them, and for that reason, in fig. 4, curve 6, the curve, which should always remain outside of the circle, passes within. However, the machine served its purpose in so far as it shows that the springs do retard the maximum, so that, whereas it should be on the vertical axis, it is carried over, in some cases more than 20 per cent. The pencil point which traced the curves was placed at the centre of gravity of the weight, so that it records the movements of the weight.

The method of obtaining a curve was as follows: A drawing-board, clamped to the carriage of the lathe, and with a sheet of paper stretched upon it, was moved up until the pencil point touched it. Then the lathe was started and the curve traced; and the number of revolutions per minute counted by means of a speed indicator. After that, the carriage was run back and the radius of the centre of gravity of the weight measured. Owing to the fact that the data had to be obtained while other machines in the shop were being used, the speed of revolution varied considerably during the experiments, and in all probability the speed noted is not exactly the same speed as that at which the curve was traced.

The following table gives the results of the experiments, showing the different loads and the deflections corresponding. The notation is as follows:

r = distance of centre of gravity of the weight from the axis of revolution, in inches,

N = number of revolutions per minute,

v = velocity of weight, in feet per second, as calculated from the formula:

$$v = \frac{2\pi r N}{12 \times 60}$$

F = centrifugal force in pounds = $\frac{W v^2}{\frac{r}{g^{12}}}$

$P = \frac{1}{2} F$ = load on each spring,

a = theoretical deflection of spring in inches, and equal .022,366 P as in (26),

a'' = observed deflection in inches, as measured on figs. 5 and 6,

n = angle at which maximum occurs; measured to the right of vertical axis.

The first column gives the numbers of the curves as given on the diagrams figs. 3 and 4.

TABLE OF RESULTS.

No.	r.	N.	v.	F.	P.	δ.	δ.	n.
3.	2.41	272	5.720	16.14	8 07	.181	.23	21.5°
4.	3.59	252	7.895	20.64	10.32	.231	.42	19°
5.	4.31	256	9.629	25.57	12 78	.286	.54	17.5°
6.	5.81	264	13.385	36.66	18.33	.410	.65	17.5°
7.	6 59	264	15.183	45.58	20.79	.465	.76	16°
1.	2.41	440	9.254	42.24	21 12	.472	.42	19°
2.	3.16	440	12.134	55.39	27.69	.619	.55	22°

It will be noticed that the deflections, as observed on the curves, do not correspond to the theoretical deflections. A possible reason for this is that the springs for fig. 4 are a different set from those used in fig. 3, and they began to take a set, which increased with the pressure upon them, until for curve number 7 the springs were about $\frac{1}{8}$" shorter than when they were put into the machine. That made about $\frac{1}{4}$" of lost motion between the two springs, in which space the weight had no resistance from the springs.

As has been said before, these sources of error serve to render the results satisfactory, only in so far as they serve as suggestions for further investigation.

As the effect of the centrifugal force of the excess of counterbalance increases with the speed, the lifting effect must increase. The force exerted in the cylinder by the steam transmitted through the rods to the crank-pin of the wheel can be found; and thence the force tending to rotate the wheel, considered as acting at the circumference of the wheel, where it rests on the rail. This force can be found for any point in the revolution, and for the same point the weight on the rail may be found, this last varying, of course, with the direction and amount of centrifugal force. Thus having found for any point in a revolution, the rotative force at the rail and the weight on the rail, the ratio between them is easily determined, which we may call the co-efficient of slip.

Now, the ratio of the force applied horizontally at the rail, and which will just produce slipping, to the weight on she rail, is called the co-efficient of friction or adhesion. Values for this co-efficient are given by Haswell, and vary, according to the condition of the rail, from .09 to .33.

Mr. J. N. Barr discusses in the *Railroad Gazette* (Feb. 6, 1891, p. 92) the relations between the co-efficient of slip and the co-efficient of adhesion, and finds, experimentally, that the former does not exceed the latter at times.

The conclusions were drawn from experiments on an engine going at the rate of 40 miles an hour. Others have called attention to the fact that these spots have a

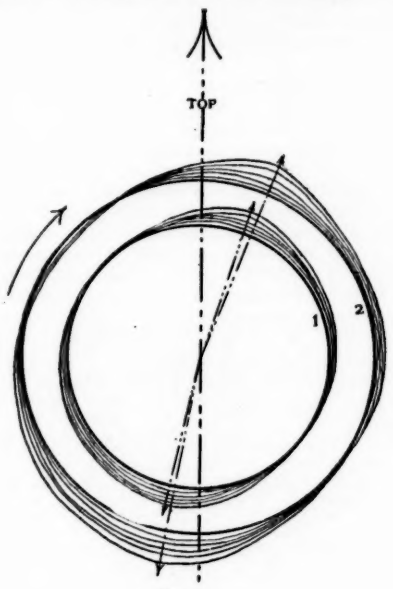


Fig. 3.

tendency to group themselves at corresponding points on the wheels of a locomotive.

However, the data are so meager that it would be foolish to state that any given spot was caused by any certain action. But may it not be assumed in the light of the imperfect experiments just described, that the centrifugal force of the excess of counterbalance, taken

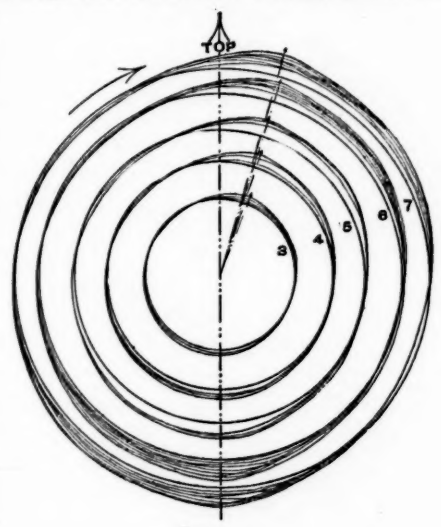


Fig. 4.

in connection with the driving-springs of the locomotive, has considerable to do with the location of the worn places in the tires?

The Intercontinental Railroad in South America.

This line should be east of the Andes, because these mountains are so near the Pacific Ocean that, in but few places are there any plains that would be available. The slopes of the mountains are so rugged as to make a line on them impracticable. Neither should the line go far east of this range, or it would encounter another difficulty in the crossing of the drainage of the Continent, which would involve the building of many large and expensive bridges.

Route.—The general location should be as follows: Starting south on the eastern side of the Isthmus of Panama (somewhere south of Aspinwall); going west of the Gulf of Darien into the valley of the Atrato, up this valley to its head, across the divide to the Cauca valley, and up it. From this valley to that of the Aqua Rico or Napo will be found the most difficult part of the line to locate and expensive to build.

The line will cross over the highest part of the country, and in doing so probably two of the main ranges. It will get into the drainage of the Magdalena, the Caqueta and the Putmayo before reaching that of the Napo. Then down the Napo valley to the Amazon; up this valley to the mouth of the Ucayale; going up on the banks of this stream and its branch, the Urabamba, to the head waters of the latter. Across this summit (La Rayo) and down the valley of the Pucara to Puno, which is on the western side of Lake Titicaca; thence along the western shore of this lake to its outlet, the Desangedero River. Cross this stream, and go down the valley on the eastern side to Lake Pansa. Pass to the east of this lake and cross the range into the drainage of the Pilcomayo River, a branch of the Rio de la Plata. Following down this valley, a connection can readily be made with the railroads of the Argentine Republic. See map attached.

Connections.—Bogota, the capital of the United States of Colombia, can be reached by a line up the valley of the Magdalena to Honda, from where a road is built to the capital. Quito, the capital of Ecuador, is accessible by a line up the Coca, a branch of the Napo.

Access to Lima, the capital of Peru, is much more difficult. A line has been surveyed from near the end of the Cerro de Pasco branch of the Ferro Carril Central del Peru to the navigable waters of the Amazon. The distance from Lima is about 400 miles. Of this 80 miles is in operation, 50 is being built, and 80 miles more is under contract. If the remainder is built a connection can be made by boat with the main line near where it crosses the Amazon River. The main line will pass within 15 miles of Cuzco, and use 230 miles of the Southern railroad system of Peru, connecting by it with Arequipa and also with Mollendo, its seaport on the Pacific. After passing Lake Titicaca, a short and easily built branch will establish connection with La Paz, the capital of Bolivia. From near the mouth of the Pilcomayo, connection can be made by a transfer boat with Asuncion, the capital of Paraguay, and a line that is now built from Asuncion to Villa Rica, which is on a branch of the Parana, can be extended down this branch to the Parana;

then up this river to the mouth of the Rio Grande and up this stream to the town of Cachocira. From there to Rio Janeiro a road is already built.

Connections with the Argentine system would soon give one, by way of the Ulspallata Pass with Santiago, the capital of Chile, and with Valparaiso, its principal seaport; and another will connect Copiapo and Caldera, by way of the San Francisco Pass.

Rise and Fall.—There will be three grand undulations; the first of these being the greatest, as it is here the greatest elevation on the whole line, will be reached (something over 16,000 above sea level) in crossing from the drainage into the Carribean sea into that of the Amazon. The descent being to the Amazon, where it is navigable, the elevation will probably be under 2,000 ft.

The second summit which the line will pass, is that through which the Juliaca Cuzco road is now being built. In this summit (La Rayo) is a small lake from which a small stream flows to the north into the Amazon, and to the south into Lake Titicaca. This summit is 14,200 ft. above sea level. The lowest elevation the line will reach in this interior basin (of Lakes Titicaca and Panusa) will be about 12,200 ft.

The third of the great summits is in the range separating the waters of the interior basin from those of the Rio de la Plata. This will be about 13,500 ft. in elevation, and the descent from these will be gradual to the sea level. The first of these summits is in the United States of Colombia, the second in Peru, and the third in Bolivia.

Grades and Curves.—There will be long stretches of light grades, with four per cent. near the summits, with one or more pieces of the same on each of the branches of the Amazon, the Napo and the Ucayale. Where light grades are used there will be easy curvature, but wherever any suspended grade lines are necessary there will be the place for much curvature and many curves of the maximum degree.

Surveys.—The most difficult part of the whole route to survey will be from the second parallel north to the eleventh south. The northern portion, mostly on account of the rugged character of the country, and the other from the very dense tropical vegetation. Every foot of advance will be gained by the use of the ax and machete. The country will soon be full of timber after the eleventh parallel is passed, and south from Cuzco the country is open plains or bare summits down far in the Argentine Republic.

Material and Supplies.—All of the material except timber and most of the supplies will have to be brought from the coast, until the Marañon is reached, and then all can be brought in by the way of the Amazon. After

that these things will have to come from the west coast, at Molendo, by the railroads of the southern system of Peru. Farther south the road building from Antofagasta eastward will probably reach the main line, and furnish another source for supplies. When the Argentine Republic is reached supplies will probably soon be accessible.

Grading.—With the exception of some large tunnels that will probably be found necessary in the ranges crossed between the Cauca and Napo, and some smaller ones on these streams, and the Ucayale and its branches, the grading will be found to be light, especially in the southern part of Peru, and through Bolivia into the Argentine Republic, as the country is open, the grades light and the valleys smooth for long distances.

The only range crossed has light slopes, and is much easier crossed than any of those lying farther north. Considering all this the average cost per mile will be quite moderate.

JAS. R. MAXWELL.

CHICLA, May 4, 1891.

Centrifugal Water Feed Grinding Machines.

The accompanying illustration present two styles of new patented grinding machines manufactured by Messrs. Pedrick & Ayer, of Philadelphia, Pa. A centrifugal movement is applied to the water to effect its retention and movement upon the grinding wheels while at work. The water is originally applied to the wheel or stone at a point near its centre, and moves through the effect of capillary attraction and centrifugal force from the centre to the larger circumferences and necessarily must travel along the material or face of the wheel provided the incline is not too near a horizontal. The movement of the water corresponds with the revolution of the wheels, the higher the speed of revolution the quicker the movement of the water along its face meeting readily the demands of the tool, being ground or metal being cut at such speeds. The wheels at their larger diameters are encased with a shell which retains the water and drops it by force of gravity to a tank at the bottom set sufficiently high to furnish a head force for the delivery of the water to its starting point at the center of grinding wheel. When grinding a tempered tool it is quite necessary to have a reliable feed of water to prevent any overheating and drawing of temper. Ordinary methods of water feed have been found wanting in this particular, hence the construction of this centrifugal water feed machine.

Fig. 1—No. 4 Gouge and Cutter Grinder.

The first illustration shows a Pedrick & Ayer machine adapted to the grinding of inside gouges, cutters and similar tools having concave cutting edges. It is found quite serviceable and is as efficient as the gang of wheels mounted and operated after ordinary methods. It can be relied upon to operate with ample water for any kind of tool work as long as its tank is kept supplied to a proper working level. The water supply is fed in at the top.

The second illustration shows a machine designed for the grinding of all kinds of wood-making tools of straight face and edge, as also for machinists' clupping tools and the like. The wheel is 12 in. in diameter by 2 in. thick, set horizontally on a steel arbor 1¼ in. in diameter. Centrifugal force keeps this wheel supplied with water, it being moved over the surface to the extreme circumference, whence it drops to the tank and is again fed to the wheel.

Various sizes of the machines here shown will be kept in stock, as also machines of other shapes and uses.

The Patton Motor.

There has been recently developed at Pullman a new motor known as the "Patton motor," on which experiments have been making now for some time. The object has been to combine various appliances now in use to make an independent traction car which will carry or haul traffic without the assistance of outside forces, and the patents are based not on the invention of any new machine, but on the combination of several other machines.

There has been built at Pullman a short tram car with six or eight feet of the centre closed in. In this centre box or house is placed a 20-H.P. Baxter motor run by a Van Dusen gasoline upright engine with a small dynamo, the current generated being about 250 volts. Under the car seats are 100 Pumpelli storage batteries which are expected to charge up to 45 H.P. It is designed that the power generated from the engine and dynamo will be more than sufficient to run the car under ordinary circumstances, such as on a straight or level track, and that the surplus energy will be stored in the batteries, so that in making a start on a curve or dragging up a heavy hill this reserve power may be drawn upon enough to accomplish the result until the necessary expenditure again falls below the power from the dynamo, when the charging of the batteries again commences.

As is well known, the excessive draft on the capacity of electric cars comes by "fits and starts;" which being the case, some such application of surplus storage system as this should meet the needs at just that portion of the run.

The relative placing of the different machines in the small space available is simply arbitrary, and may be done to suit the best judgment of the builder; but the proportioning of their sizes is a matter which should have careful attention, and it has not yet been definitely settled whether the horse power of the engine or motor or the size of the dynamo are best calculated for the number of cells, and in a measure this will be determined in special cases by the conditions of the roadbed and the probable traffic. The advantage of having a car that will run on any track, independently, without overhead or underground wires, but which may use in part, if necessary, lines having any of these other appliances, is becoming more thoroughly taken under consideration. Especially is this the case in some of our larger cities, where overhead electric wires are prohibited wholly or in part; also motors of this character might be used to advantage on cable lines where trailers are cut off and finish the remainder of their trip with horse power.

As to the economical working of this car, it is found that one gallon of gasoline will operate the car for 10 miles on a straight level track, or an expenditure of about $^{6}/_{10}$ cents per mile, which of itself should not tend to lessen investment in that class of rolling stock.

The Abt System of Rack Railroads.

The following list of Abt rack railroad lines is from the *Génie Civil*, published in abstract by the Institution of Civil Engineers. The principal lines upon which the Abt system is used are:

1. The Hartz line (Brunswick), ordinary gauge. Length, 18.9 miles, of which 4.34 miles are provided with rack upon eleven sections of lengths, varying between 272 and 1,690 yards, with grades of 4.5 and 6 per cent. This line has been working since 1885.

2. The Erzberg iron mines (Austria, on the Eisenerz-Vordenberg line) ordinary gauge. Length, 12·4 miles, of which 9 miles are provided with rack grades of 7.1 per cent. on the straight, and of 6.5 per cent. on curves of 196 yards radius, two plates, three driving axles; load drawn, 100-120 tons minimum. Began work this year.

3. Visp to Zermatt, for tourists, metre gauge. Two plates of 0.78 to 0.97 in. thick according to grade, two driving axles, grades of 12·5 per cent. mounted by trains of 45 tons, curves 65 yards radius.

4. Mendozza to Santa Rosa (South America). In construction, to be finished in 1892. Crossing the Andes, connecting Buenos Ayres and Valparaiso. Metre gauge, length of the part in the mountains 64 miles, 17.3 miles fitted with rack-grades of 8 per cent., and radii of 126 yards.

5. Diacophto to Kalavryta (Greece). Gauge 29.2 ins., grades of 14.5 per cent., curves of 87 yards radius. Rack composed of two plates 0.62 in. thick, three driving axles; load drawn, 15 tons at 9.3 miles per hour on grades 3.5 per cent. without racks, and at a speed of 3.1 to 6.2 miles at grades of 14.5 per cent. with racks, line being partially worked.

6. State Railways in Bosnia and Herzegovina. Length 42 miles, of which 12 miles are fitted with rack of two plates in six sections, grades of 3 to 6 per cent., three driving axles. Each locomotive draws a train of 70 tons up a grade of 6 per cent. Working already begun, and to be completed this summer.

7. Central Dominican at Puerto-Plata, Saint Dominic. Now being built to Santiago. Grades of 9 per cent. with curves of 109 yards radius, gauge 29.5 in. Load drawn, 50 tons at 9.3 miles per hour on grades of 4 per cent., and at 4.3 miles per hour on grades of 9 per cent.

8. Monte Generoso (Switzerland). Tourist line, 5.6 miles of rack, gauge 31 inches, grades from 0 to 22 per cent. with curves of 65 yards, two plates in the rack and two driving axles. Each engine draws a carriage with fifty-six passengers.

9. Rothorn. Similar to No. 8.

10. Glion Railway. Similar to No. 8 and No. 9.

11. Puerto Cabello to Valencia (Venezuela). Metre gauge, grades of 8 per cent., radii of 125 yards, rack of three plates 0.85 in. thick, two driving axles, and load of 60 tons drawn on a grade of 8 per cent.

12. Manitou to Pike's Peak (Colorado, U.S. A.). Tourist line, starting at an elevation of 7,560 ft., and reaching an altitude of 14,170 ft., being 2,360 ft., above the limit of vegetation. Fitted with rack for a distance of 9 miles, grade of 0 to 25 per cent., radii of 122 yds., two plates of 0.78 to 1.25 in. thick, three driving axles, ordinary gauge, mean speed 5 miles and a minimum speed of 3.1 miles per hour.

13. Electric Railway upon Mont Salève, metre gauge, grades of 25 per cent. with curves of 65 yards radius, length 5.6 miles, rack of two plates, 0.62 in. thick. Working for construction purposes will commence this summer, and the regular service next year.

14. Aix-les-Bains to Revard. This will be the first mountain railway constructed in France. The opening will take place in June, 1892, all the metal work will arrive next August. Metre gauge, length 5.7 miles, fitted with rack the whole distance of two plates 0.97 in. thick. Each locomotive will pull a carriage containing sixty passengers.

15. De Veyrier to the peaks of Mont Salève (Franco-Swiss neutral ground). Line not yet begun.

16. Lastly the line from Cluses to Martigny, via Chamounix, the construction of which has been recently authorized and the works will be begun immediately.

The system is thus becoming largely used, about 247 miles being constructed, of which 121 miles are fitted with rack.

The line referred to as 5, 7, 14, 15 and 16 have been or are to be built by the Cail Company.

The London Stock Exchange.

A late number of the *Financial News* (London) publishes an illustrated supplement giving a ground plan and several views of the London Stock Exchange, also fac-similes of the official lists of Jan. 11, 1825, No. 27, and May 25, 1832, No. 11,850. The list for 1825 shows only 35 securities, viz., 4 assurance companies, 8 mines, 8 gaslight and coke companies, 7 "iron railways" and 8 "miscellaneous," among which is the gas-engine carriage, £100 shares, £2 10s. paid.

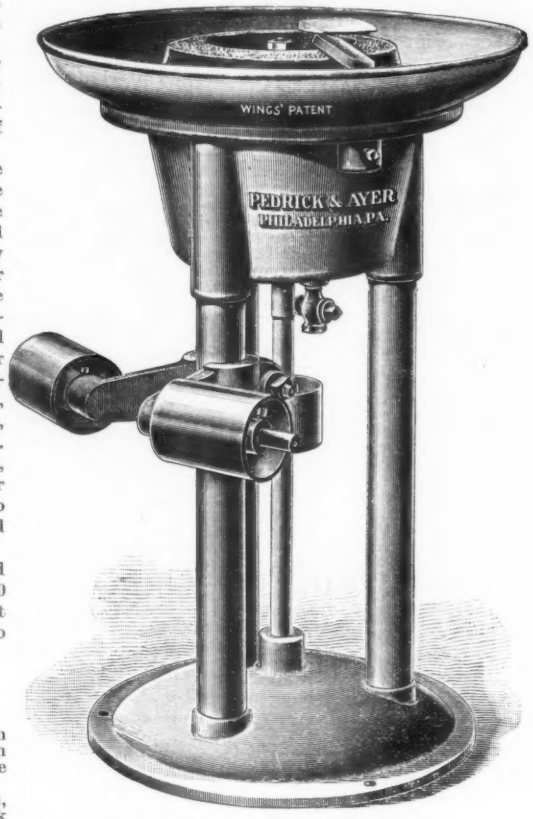


Fig. 2—No. 12 Upright Grinder.

The "iron railways" are the Bath & Bristol, Birmingham & Liverpool, Bristol & Birmingham, Kentish, London & Birmingham, London & Bristol and the Manchester & Liverpool. Only one of these, the Bristol & Birmingham, had over £1 paid on the £50 shares.

By 1832 the dealings had increased. There is a long line of "American" stocks, nearly all state bonds, which are quoted for April 23 in New York and May 25 in London. Canals were also dealt in, notably the Coventry, £140 shares at 730; Stafford and Worcester, £170 shares at 532, ex div., and the Thames and Medway, £20 4s. 3d. shares at 15s.

Only five "iron railways" are on the list, viz.: Chittenham, £100 shares at 78; Clarence, no business; Forest of Dean, no business; Liverpool & Manchester, £100 shares, at 200@202; Stockton & Darlington, £100 shares at 275.

Among the other securities are docks, bridges, waterworks and roads. One of the roads mentioned is the Commercial road, East London, which had been built by Mr. Walker a short time before, and was built with granite "tram stones," each 16 in. wide, 12 in. deep and 5 or 6 ft. in length. The fact that a tool road was built out of Whitechapel road through St. George in the East and Stepney a little over 60 years ago is eloquent of the growth of London.

A Royal Commission was appointed in 1877 to inquire into the "origin, objects, constitution, custom and usages of the London Stock Exchange, on account of certain disclosures in connection with the Foreign Loans Commission." The report, which was made in 1878, "dealt with a number of notorious scandals," and recommended that the stock exchange should be incorporated by royal charter or by act of Parliament, saying: "It is to be borne in mind that so long as the Stock Exchange remains, as at present, a merely voluntary association, subject to no external control whatever, little permanent advantage can result from any attempt to effect improvement in the rules and regulations of the governing body, or the mode in which transactions on behalf of the public are carried on." This was apparently a satisfactory state of affairs to the exchange, and they are still without either charter or act.

There are two classes in the exchange—the jobbers who stay in it and constitute the stock exchange, and the brokers who take orders outside and visit the exchange to have their orders filled, acting merely as au-

thorized representatives of the public. "The jobber is the wholesale dealer, and he is placed by the constitution of the market in the unique position that he does not know whether his customer is a buyer or a seller. The broker asks him to make a price on a specified quantity of stock or number of shares. He quotes, say, 27½-¾, which means that he binds himself to buy the quantity named at 27½ or to sell it at 27¾. The difference, or part of it, is his profit."

A Big Spur Gear Wheel.

The cut herewith represents a large machine cut, spur gear made by the Walker Manufacturing Co., of Cleveland, O., which was used in connection with a steel pinion made by the same concern on large pumping engines for removing water from one of the South African dia-

Machine Cut Spur Gear—30 ft 6.66 Diameter.

Built by THE WALKER MANUFACTURING CO, *Cleveland, O.*

mond mines. The dimensions of this gear are as follows: 192 teeth, 30-ft. 6.66-in. pitch dis., 30-in. face, 6-in. pitch; bore, 27 in., diameter of hub, 9 ft. 2 in.; weight of hub, 15 tons, and the total weight of gear 66¾ tons.

Some conception of the exactness required in the formation of this large wheel may be realized when it is known that the owners, in order to provide for a possible breakage, which is most improbable, ordered one segment and one arm additional, the requirements of which were that these parts might fill any position in the wheel. The illustration shows a fine piece of machinery.

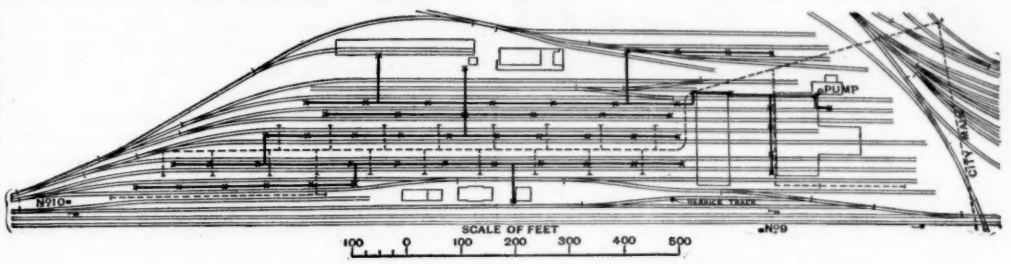
This gear, with the steel pinion, was the only part of the pumping machinery which was made in this country, the balance of the work being contracted for in England. In reply to an inquiry as to why the gears had been singled out for manufacture at a different point than the rest of the machinery, the engineer of the company replied that he thought they could rely on getting a superior class of iron in America, and he knew they could secure as perfect work.

Air Piping for Oakland Passenger Yard—Southern Pacific Railroad.

With the increased use of air brakes it has been found necessary to provide some means of rapidly testing the efficiency of such brakes on cars while they are standing in yards. An arrangement of air piping for the purpose is shown in the accompanying illustration, whereon the tracks are shown by double lines and air piping valve by the letter *X*.

The air pump is located at a convenient point and a large reservoir connected furnishes a sufficient supply of air at all times. The cocks for connecting the hose to test the cars are placed about 100 ft. apart. The connection is made by regular couplings with an extra stout piece of hose. The dotted lines show the water mains and connections for washing the cars.

While the Southern Pacific Company has not yet built similar sets of piping for testing the air brakes on freight cars, yet it is expected to do so in the near future, as it is found cheaper and quicker to test all the cars from stationary piping than from switching engines. This subject is of special interest in view of the action of the Master Car Builders' Association in considering the rules governing air-braked cars in interchange. It would be difficult to pass the large number of freight cars which go through some interchange points daily and give them proper inspection without providing some system of this sort.



Air Piping in Oakland Passenger Yards—Southern Pacific Railroad.

TECHNICAL.

Manufacturing and Business.

Reginald Canning & Co., of 115 Broadway, New York City, will, as agents, sell at public auction, beginning Aug. 27, at the warehouse yard of the American Equipment Storage & Warehouse Co., at Lakeview, N. J., the following second-hand rolling stock: 41 box cars, seven passenger cars, 13 standard gauge locomotives, including 8-wheeled passenger, 8-wheeled freight and 10-wheeled freight engines, 23 street cars, 12 ft. long, and 13 street cars 16 ft. long; six standard gauge contractors side dump cars and three narrow gauge contractors end dump cars with a capacity of two tons. Besides this rolling stock there are to be sold 12 parlor car chairs; 26 plush upholstered car seats, 14 sets of Miller platform and couplers and 14 car stoves. Catalogues can be obtained of Reginald Canning & Co.

The Richards Momentum Brake Co., of Jersey City, N. J., has filed articles of incorporation, the capital stock being placed at $100,000. The company propose to manufacture the Richards' car brake. H. S. Richards, of Orville, Pa.; Lindley Murray, 28 Seventh avenue, Brooklyn, N. Y., and A. A. Rice, Jersey City, N. J., are the incorporators.

The Chapel Automatic Railway Gate Co., of Marengo, Ill., has been incorporated by E. A. Chapel, C. H. Donnelly and others to manufacture railroad gates. The capital stock is placed at $100,000.

E. J. Robinson is now the Vice-President and General Manager of the Laclede Car Works of St. Louis.

The Mills Improved Pneumatic Brake Co., of Chicago, was incorporated in Illinois last week, with a capital stock of $600,000, by W. Mills, W. B. Mills and O. A. Bogue.

The Duluth Manufacturing Co. filed articles of incorporation at Elizabeth, N. J., this week. The capital stock is $1,250,000. The incorporators are: Col. Archer N. Martin and H. Fiske, of Summit; Gen. Stewart L. Woodford, of Brooklyn; Lucian G. Matthews, of Peewee, Ky.; Omar H. Simonds, of Duluth, and Charles W. McLellan, of New York. The company is probably a reorganization of the Minnesota Iron Car Co.

The New York Central & Hudson River road is putting in about six of the new Fontaine signal machines on its tracks in Buffalo. These machines are a time-interval signal showing to an engineer by a dial the time at which a preceding train has passed the signal.

Iron and Steel.

The first mortgage six per cent. 20-year bonds of the Atkinson Steel & Spring Works, of Chicago, were offered for investment last week. The capital stock of the company is $300,000 and the first mortgage bonds $100,000. The proceeds of sales of bonds are to be applied to payment of floating debt, constructing a plate mill and providing additional working capital. The present net earning capacity of the works is $36,000.

The Norristown Steel Works has its plant at Norristown, Pa., nearly ready to commence operations. It is pronounced one of the finest mills in the United States. By a graduated process can be cast at the mill, steel mouldings ranging from half a pound to 36 tons.

The Pottsville Iron & Steel Co. has put another of its furnaces in operation at West Hamburg, Pa., and now has five large double furnaces running with non-union hands. The company pays its puddlers $4 per ton.

The National Forge & Iron Co., with mills at East Chicago, has made an assignment in favor of Gilbert B. Shaw, President of the Chicago Trust & Savings Bank, as assignee. The liabilities are estimated at $400,000, and the assets at about the same amount. The company was organized March 12, 1889, with a capital stock of $250,000.

Articles of incorporation of the Minneapolis Malleable Iron Co. were filed in Minnesota last week. The capital stock is $50,000. The works will be located at St. Louis Park, Hennepin County, Minnesota. The following are the directors: George T. Leitch, A. M. Allen, G. M. Walker, Minneapolis. G. M. Walker is President; G. T. Leitch, Vice-President and Manager, and A. M. Allen, Secretary and Treasurer.

The Atlantic Trust Co. of New York has filed a bill at Chattanooga against the South Tredegar Iron Co. for the foreclosure of a mortgage of $60,000, issued about two years ago to secure the payment of $60,000 borrowed money. Bonds were issued by the company running ten years and bearing six per cent. interest. The Atlantic Trust Co., as trustee for the bondholders, alleges that the Iron Co. is insolvent and unable to meet its obligations.

The Rail Market.

Steel Rails.—The inactivity which has been so marked for so many months still continues, but there seems to be a more hopeful feeling in the West. The report of the Board of Control for Aug. 1 shows aggregate sales of 860,755 gross tons, standard sections, while the shipments to that date were 584,938 tons. The *Iron Age* makes the following comparison with July 1: "Sales, 808,910, an increase of 52,000 tons; shipments, 454,423 tons, an increase of 130,000 tons. It is evident, therefore, that the mills are rapidly catching up with work booked. During the last two months the Western mills have been running relatively full." The quotations at Chicago are $31.50@$32.50 and at New York $30.75@$31.

Old Rails.—Few transactions are reported. The demand is light and the stock carried is not heavy. At Pittsburgh old iron rails are quoted at $23@$23.50 and old steel rails at $17.50@$18. At Chicago the quotation for old iron rails is $23.25 and for old steel rails $14@$16.

"La Touraine."

An interesting feature of the new French Atlantic liner, "La Touraine," is the small amount of power expended in driving the large hull at fast speed, the record of all the other ocean flyers having been beaten by this latest arrival. Her displacement is 11,675 tons, and to drive her 20½ knots she has twin screw engines of 13,000 indicated horse-power, which is equal to 1.11 i. h. p. per ton of displacement. For the same speed the "City of Paris" had 1.38 i. h. p., the "Etruria" has 1.36 i. h. p. for 19 knots and the "Teutonic" has 1.42 i. h. p. On her maiden trip from Havre to New York "La Touraine" beat the record from any French port, the time being 7 days 3 hours and 11 minutes.—*Iron Age.*

Car Heating Couplers.

A meeting was recently held in New York of representatives of the Reading, the Baltimore & Ohio, the Boston & Maine, the Central of New Jersey, the Central New England & Western, the Pennsylvania, Poughkeepsie & Boston and the Pullman Company. The object was to select a coupler for steam heated cars running between Boston and Washington. We learn that the Gibbs coupler was selected by a majority of two votes.

The Chignecto Ship Railway.

Work on this project is stopped and all of the men have been discharged except a few on the engine house at Tidnish and on some odd jobs. The engine house is practically completed, the machinery is all in place, the gridiron and lifts are on hand ready to be put in place. The masonry could be completed before Oct. 1, and the whole put in working order by Nov. 1. It seems unfortunate, therefore, that the financial stringency in London should have interrupted this most interesting and important work which is watched with so much attention by engineers all over the world.

Ventilation of the Jersey City Train Shed.

The ventilation of the new train shed of the Central of New Jersey at Jersey City has been found to be imperfect, in that the sulphur from the coal ascending to the roof caused serious rusting of the iron. This defect is now being remedied by alterations of the peak or combing to admit of a current of air that will prevent any accumulation of gases around the metallic framework of the roof. The new train shed and passenger station in Jersey City have been in use about a year. The train shed proper, though not so large as that of the Pennsylvania Railroad just completed, is an immense structure, being 512 ft. long, 215 wide, and 70 ft. high at the peak, and like the Pennsylvania shed, it is provided with twelve tracks.

Car Heating.

We have recently heard from several quarters a rumor to the effect that the Gold Car Heating Co. has been sold sold out to the New York Safety. We are authorized to state positively that there is no truth in this story, and moreover that there are no negotiations on foot looking to the sale of this company to the New York Safety or to any other concern.

The Morton Safety Heating Co., of Baltimore, has a contract from the Belt Line, of Toronto, Canada, to equip its new cars with the Morton heater, and the material has already been shipped to do the work. President T. Edward Hambleton, of the Baltimore Traction Co., has given an order to fit up all the cars on the Pikesville line with this system, to be ready for the fall and winter travel. Mr. C. M. Benninghaus, President of the Rapid Transit Co., of Baltimore, has notified the General Superintendent of the Morton Safety Heating Co. that all of the motors now being constructed by his company will be specially arranged for using the Morton storage heater on all cars drawn by the motors.

Steel Chimneys in Chicago.

Steel is being used in the construction of a chimney, which will be 250 ft. high., in "The Fair" building, designed by Mr. W. L. B. Jenny, at the corner of State, Adams and Dearborn streets. The outside diameter is 9 ft. 5 in. and the thickness of the steel varies from ⅝ to ⅜ of an inch. The lower 75 ft. of the chimney is lined with 8-in. firebrick, molded to fill the shell completely, and above this it is lined with hollow tile. The lining is supported every 25 ft. by angle iron riveted to the steel shell. The chimney, which is estimated to cost about $7,000, is to serve twelve 6-in. boilers 20 ft. long. The calculated weight is about 250 tons, as against 700 tons for a brick chimney, and the space occupied by a brick one would be 16 ft. 6 in., as against 9 ft. 5 in.

Another one for the Leiter building, corner of State and Van Buren streets, is projected for nine 72-in. boilers 20 ft. long, which will be 10 ft. 3 in. in diameter and each only 200 ft. high.

The Caldwell Sash Balance.

The Caldwell Manufacturing Co., of Rochester, N. Y., has put on the market an excellently designed and constructed spring sash balance for car windows. The friction arrangement for graduating the tension is extremely simple, and the rubbing surfaces are of metal, and cannot wear out. There is but one spring, the main coil spring, and the number of parts is reduced to a minimum.

Car Couplers.

The Standard Car Coupler Co., of Troy, N. Y., and the Thurmond Car Coupler Co., of New York, have reached an understanding in the matter of patent interferences, which have been open for some time. Now they have agreed upon a settlement, and each company is licensed by the other to build under its own patents, and all suits have been withdrawn.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The operations of the North Carolina Railroad Commission are bringing the usual crop of complaints. They come from the side of those who forced this part of the legal machinery into existence. The Commission, after laying down the rules by which its decisions were to be governed, in a document of 71 pages, made slight reductions in local freight and passenger rates, restricted the charges of the Western Union Telegraph Company, provided for a few through freight and passenger trains from the West to the East, and ordered the building of several cozy passenger stations where cast-off house cars formerly stood. Just at this time it has under consideration the taxation of the railroads. No part of its duty is more difficult to perform in justice to all interests concerned than this, and it is natural enough that at this point the public patience should be strained. People know little of the real workings of a commission which must often spend months of arduous labor in reaching a result that only serves to disappoint an expectant public. The Commission has been in existence only four months, and has 60 railroads to take into account. The act by which it was created, and in which its duties were defined, was an unusually creditable one. The personnel of the Commission is such, fortunately, that its slow procedure is the best proof of its good sense. The best way to bring to naught its services for good is to keep grumbling at it. Nothing, perhaps, tends more to drive competent men out of a difficult public service than just such unreasonable complaint—complaints that come not from the railroads themselves (for they are ready to welcome any practicable and reasonable reform), but from people who either have little at stake or are chronic grumblers. The whole thing finally ends in the commission's being loaded down with men who are willing to dance to the piping of the professional "reformers." By this time, no doubt, these commissioners have learned that the deeper they get into the railroad business the more deeply they are convinced of the want of understanding—not to say ignorance—on the part of the public of the nature of the work required of a commission. A commission that does its work well must either have plenty of suppressed contempt for the unreasonably dissatisfied or tact enough to fool the fools. How to amuse the public till it gets its results worked out is the problem. It is too early to judge of the North Carolina Commission now. Two years hence it will lay its report before the state legislature; there will be plenty of time to criticise then. As North Carolina has a superior commission, it is safe to predict that the sound popular appreciation will be with it when its biennial term ends.

Freight Train Brakes in Australia.

The recent freight train brake trials in Australia have resulted, as might be expected, in demonstrating the superiority of the Westinghouse quick-acting brake, which, already largely used, is now likely to be generally adopted in that continent. During May and June extensive trials were made between it and a quick-acting automatic vacuum brake which was exhibited and received a gold medal in 1889 at the Paris Exhibition, but has not yet come into practical use. The latter brake obtains the quick action by means of an ingenious valve which admits air under every car in the train, whenever a sudden application is desired, or the hose is parted, but remains non-operative in graduating. The grave objections to this device are obvious, for the admission of air entails that of dust and grit which are peculiarly deleterious where the valves are light and easily held off their seat and the working parts cannot be lubricated. The trials showed, moreover, that the quick-acting device fails to secure the rapidity of action attained by the Westinghouse, the latter being fully applied to the 48th car in 2.23 secs., while in its rival 3.40 secs. elapsed from the handle of the engineer's valve being placed in the position for full application. The vacuum thus consumes 50 per cent. more time to apply than the Westinghouse. This difference in speed is sufficient to be important, severe shocks being experienced in some emergency stops with the vacuum brake, while none were felt with the Westinghouse, despite the loose couplings used.

Considerable importance appears to be attached in Australia to the power of a brake to control a train down a long incline. At the recent trials, near Sydney, tests were made down a grade 30 miles long, with ruling grades of 160 and 176 ft. per mile. Trains of 20 and 35 cars respectively were easily controlled down this grade by the Westinghouse quick-acting without the use of the retaining valve. Gauges placed on the auxiliary reservoir showed a small consumption of air, for with the pump running very slowly the pressure rose from 59 lbs. at the summit to 75 lbs. 3,000 ft. lower down, near the foot of the grade. A stop made here with the vacuum train revealed the astounding fact that the brakeshoes on one-third of the cars in the train were perfectly cold, and had evidently not been working for some considerable time, if at all, during the descent. An emergency stop was made a few miles further on, when all the brakes were found to have operated. Such an exhibition of uncertainty of action in a train newly equipped and apparently in perfect order needs no comment.

Switching tests showed a considerable economy of time and a greater convenience of handling the Westinghouse, which occupied 22 minutes in operations which consumed 30 minutes with the automatic vacuum. The latter is worked without cocks in the train pipe, and, therefore, is applied throughout the train and has to be released by hand on the detached portion directly a car is uncoupled. The brake is also fully applied on the portion of the train still coupled to the engine, and as the release by the engineer consumes over 20 seconds with a train of ordinary length, the loss of time is considerable and the brake is therefore worse than useless for switching. The vacuum brake also dispenses with cocks on the branch pipe, rendering it difficult, if not impossible, to cut out a car with a disabled brake. While train-pipe and cut-out cocks are undeniably a source of danger if not carefully handled, their use permits a considerable economy of time. A saving of 10 per cent. in the time occupied in switching means a large sum annually to the railroads of this country, and it would certainly appear that an even greater saving in this item can be obtained by the use of freight train brakes.

A Central African Railroad.

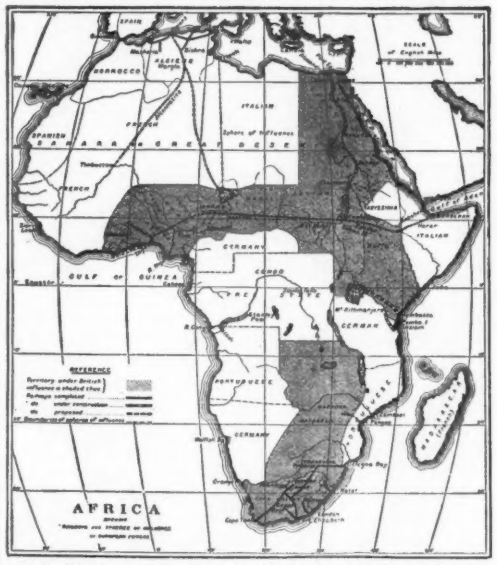
The Greatest Trust between Man and Man is the Trust of giving Counsell.—*Bacon.*

The Engineer (London) has just published a series of three articles by Mr. W. Wiseman, M. Inst. C. E., on a proposed railroad through British Central Africa. These articles are worth reading as a work of the imagination, but as "Counsell" they lack the first elements—they lack truth, sobriety and judgment. To one who has even a little real knowledge of Africa the grace with which Mr. Wiseman dismisses the appalling difficulties of the problem which he sets would be tragic if there were the remotest chance of his project being undertaken. As it will be discussed during the slack season and dropped when men are busy, the lightness of his touch is one of the charms of his writing.

The proposed line is shown in *The Engineer* of July 17 on a map to a scale of about 600 miles to the inch. We reproduce the map on a still smaller scale, but we advise any one who thinks of putting money into the enterprise to study it first on a map drawn to a scale of 50 miles to the inch. Then it will take on quite a different aspect.

The line shown follows quite closely the parallel of 10° N. lat.; from Berberah on the Gulf of Aden, to Lagos, on the Gulf of Guinea. On the same map is shown a line from Siout, in Egypt, right up the Nile valley, to intersect the east and west line at Fashoda, where it crosses the Nile, in lat. 10° N. Fashoda is actually on the west bank of the Nile and not the east, as it appears on Mr. Wiseman's map, but that is a trifle. This Nile Valley line forms no essential part of the immediate scheme, but the great and obvious advantages of connecting the two are incidentally mentioned. The east and west line, which is called the Central African Railway line, is estimated by Mr. Wiseman as about 3,000 miles long. From Siout to Fashoda by the Nile is very nearly 1,800 miles; but by a railroad line, cutting off the great bends of the Nile, it might be reduced to 1,500 or 1,600.

Mr. Wiseman admits that little is known about the topography, climate, products or people of the country through which his railroad, 3,000 miles long, is to be built; but by a very simple process, viz., guessing that the conditions will average much the same as in certain Indian countries with which he is familiar, and assuming a figure of cost per mile and multiplying it by 3,000, he estimates that the Central African railroad will cost £15,500,000 for a metre gauge line and £18,000,000 for



a 4-ft. 8½-in. gauge. We shall not dispute this estimate; but we have watched with interest the development of the scheme in *The Engineer*, expecting each week to be told how the enormous difficulties of a preliminary reconnaissance of the line are to be met; how, then, it is to be surveyed, located and constructed, and finally, what interest it will pay on an investment of $90,000,000. The series ends in the issue of July 31, and ends as it began in generalities. Consequently we venture a few observations.

Only the most superficial examination of this line has ever been made, except at the point where it crosses the Nile and for a few miles from the sea at the western end. From Lagos to the proposed crossing of the Niger, say 200 miles, the country is fairly well known. Thence for 500 miles, well into Bornu, somewhat accurate information may be had. Thence, right on to the Nile, say 1,200 or 1,400 miles, the tenth parallel has been crossed by white men only at intervals of 200 to 400 miles, and from the Nile to Berberah, say 1,000 miles, the country is even less known. What may happen in 200 or 400 or 1,000 miles of Africa one may guess at, but no sane man would risk much money or reputation on the guess. To say that in those great, unknown gaps will be found materials for construction, and "teeming millions" ready to work cheaply, and hungry to trade with civilized nations, is not only pure assumption, but is absurdly improbable.

The tenth parallel is just on the border line between the country of the semi-civilized Mahommedans and the naked, pagan negroes. Along this line they mingle, and they flow over it north and south, the semi-civilized prevailing in one longitude and the savage in another. On the whole, the influence of the semi-civilized Mahommedans is dominant enough to have slightly modified the savage conditions immediately along this parallel.

We shall not attempt to speak for the country for 700 miles from the Gulf of Guinea, to the south of Bornu. There a population may exist which is so far advanced that it will help build a railroad and will support it when built. We doubt even this; we are not sure that it would pay to build a road even 200 miles from Lagos. But to build a road from the southern part of Bornu to the Gulf of Aden, say 2,200 miles, would be an appalling and unforgivable waste of money and life.

By very far the greater part of the people are pastoral or agricultural and have few arts or handicrafts.

Such as they have are the simplest and rudest. Their agriculture is confined to producing a scanty and precarious subsistence; they grow nothing that would have enough value to stand transportation and they produce no surplus. If scarcity of rain or wars prevent making a crop there is a local famine. The writer of these lines, in marches of thousands of miles through the Soudan, has seen this condition more than once; and we know that the Mahdist wars have been followed by famine so intense that in the great city of Khartoum the people have eaten the dead in the streets. The "doorah" and the "dokhn" which make up their breadstuffs, would have no value in European markets even if they ever grow a surplus. The gum arabic, ostrich feathers and other local products which are gathered in the whole zone that could be made tributary to the central African railroad would not fill one freight train a week; and it would be hard to load even those trains back. People who produce so little that the world wants and want so little that the world produces may support a caravan commerce profitable to a good many traders, but from that to a commerce that would support a railroad the step is long.

One of the conditions which narrow this tributary zone and would add immensely to the difficulty of proper exploration of the route and to the cost of construction is the lack of local transportation. At the tenth parallel the limit of the camel's usefulness has been passed. He dies south of that line and is a feeble beast on it; consequently he is seldom bred so far south. The people have rarely had the intelligence to train any other beast of burden.

As workmen the people would be worthless and uncontrollable. They are accustomed to the use of no tools but the most trivial digging and cutting implements, and they have the reluctance of all barbarous people to steady work. Nevertheless, Mr. Wiseman says "cheap labor is practically available throughout the entire length of the railway." The only way that it can be had is to *force* the people to work. Perhaps England is ready to do that in the interest of "Christianity and civilization and the English Sabbath"; and we doubt not that it would be a capital thing for the Central Africans to be forced to work; but, as Gordon would have said, "the scandal would be too great." The fact is that those who survey the line as well as those who build it will have to face not only the indolence, the ignorance and the poverty of barbaric people, but often their steady and bitter hostility. For instance, the Nile and its immediate neighborhood at the proposed crossing are controlled by the successors of the Mahdi, and a small force of Europeans going in there would be massacred. This condition would be found for 400 or 500 miles along the southern frontier of the Egyptian Soudan. What would be the temper of the people elsewhere we do not know. The Shillooks who occupy the west bank of the Nile south of Fashoda are naked savages, and Mr. Wiseman is correct in calling them "warlike"; in fact, they have before now "cleaned out" more than one expedition of regular troops, and at least once killed the Governor of Fashoda and a battalion or two with him.

For many hundreds of miles, probably for more than half of the route, there is no timber fit for cross-ties. The acacias and other trees which are common enough rarely reach six inches in diameter. They make hard forests to work through, but are of no use for ties. Larger construction timber is almost entirely wanting. But for much of the route timber would not answer even if it were abundant, as the white ants would destroy it. Fuel for locomotives, other than wood, probably could not be found.

Finally, the whole zone is a region of mortal fevers. It is not so bad as the zone of greater rainfall near the equator, but it is worse than the drier regions to the north. There are individual white men who could live for years in this belt; but, speaking generally, of white men in mass, and of the country at large, a white man cannot live in it five years. One-third of the men in an Egyptian batallion in Darfour died of disease in one year. They were in latitude 13°, where the general altitude of the country is about 2,000 ft., the soil light and the rainfall small. In the swamp regions of the White Nile and Bahr El Ghazal the fevers are far worse than in Darfour, Kordofan or Wadai. Between these extremes lies the line of the proposed railroad. What would be the fate of white men who undertook to build that road or to colonize along it, the reader can judge.

Space will not permit us to discuss a line up the Nile valley from Siout to Fashoda. It is enough now to say that from Wady Halfa south it would have to be preceded by an army of conquest and occupation. When Sir John Fowler, acting for the Khedive, caused surveys to be made for a railroad to Khartoum, and for another into Darfour, the construction parties could have had the loyal aid of those brave spearmen who killed Gordon and Burnaby and the two Stewarts, who annihilated Hicks' army, and who, at Abou Klea, came within an acc of wiping out a square of the stanchest infantry in the world. To-day those men would have to be fought—and it is England's fault.

We have said what we have said because we believe that it is a man's duty to correct evil and dangerous "Counsell", and not in any spirit of opposition to England's enterprises in Africa. Quite to the contrary, we believe that it is the duty and the policy, and will be the destiny of England, to open up the "dark continent." A proposition so broad and so old can be supported by many reasons and we will not take the space to re-state them now; but we have no doubt that England's ascendancy in Africa will be for the good of the human race. There is no other people so fit to subdue and control a barbaric land as the English. A man of any race and country must see shining through the history of the extension of the British Empire the noblest and most brilliant human qualities, the highest genius for war and for government, the deepest fortitude and the most patient and persistent common sense. So, we have nothing to say against England's occupation of Africa, but wish it God speed. Such an enterprise as this proposed Central African railroad can only hinder it. Africa is to be conquered, like any other continent, by patient advances on the easiest lines and not by a *coup de main*.

The railroad from Mombassa toward the Victoria Nyanza is worth trying and is a proper step, but we have no notion that it will pay for a generation to come. So of the German road in from Bagamoyo. It would perhaps pay to start in from Lagos and build to the Niger; then, when trade develops, push on toward Bornu. It would not, however, be worth while to push a railroad up the Nile from Siout. The Nile itself and the existing railroad around the first cataract at Assouan are quite enough for the business to be done. Some day the road must be carried south from Wady Halfa, but that cannot be done now. Finally, when England gets ready to retake the Soudan, as she must do some time, the first step is to push a railroad across from the Red Sea to the Nile, say from Souakin, latitude 19, to Berber. By that route the heart of the Soudan would be within 250 miles, by rail, of deep water. Had this railroad been built years ago, when an American engineer who had examined the country recommended it, the Mahdi's rebellion would have been crushed before it had fairly begun, a vast land would have been saved from untold suffering, and Gordon might still be doing his noble and beneficent work on earth.

Country Roads, the Farmers and the Railroads.

While the agricultural interest is actively engaged, as it is at this time, in the consideration of the means whereby its condition may be bettered, through farmer's alliances and the like, we hope the benefits, which that interest may secure by the construction of good roads, may not be entirely overlooked, as it seems likely to be; for there is a natural disposition of the mind to ignore the improvements which are quite practicable and near at hand, seeking relief from some remote results of untried and perhaps impossible schemes,—such as taxing another class for our own benefit.

Unfortunately there is no politics in the topic of good roads and how much they will benefit any neighborhood, therefore the orators at the approaching autumnal fairs may not be expected to adopt this as a subject of discourse, although there is none of more importance to the constituency which they will then address; and we urge the journals especially devoted to the interests of the farmers not to let it drop out of sight. It is of more consequence to the farmer than any cheapening of railroad rates which can be effected, to have the cost of haul between his home and the depot reduced to a minimum; and a good road to the market where he sells his crop, would save the farmer at least fifty per cent of the cost of the transportation for which he is responsible. Besides, it would make him independent of the season as to deliveries, rendering it possible for him to rush his produce into the market at any favorable moment when prices were at their best.

There is no other citizen so entirely dependent upon luck, or fortune, or the weather as the farmer is, in all portions of this country, except where there is irrigation. He may plow and harrow, sow and cultivate in the most assiduous manner; yet if the weather is too dry or too wet, he must go without a crop; his harvest depends upon events which are entirely beyond his control. And if the weather has been propitious during the growing season so that he has secured an abundant crop, he probably will be limited to a narrow portion of the year for hauling it to market, by the state of the roads. In autumn and spring, these are likely to be impassable, especially in the South and throughout the great expanse of territory between the Alleghany and the Rocky Mountain ranges; so that, as things are now, the farmers there are subjects of the weather, even as to whither, and when, they may market their produce. And they have been so long used to this submission to the "will of Providence," as they suppose it to be, that it will require a long continued effort to persuade them that by their own resolve they may become independent of the weather in respect of highways; and that this result may be secured by a tax not exceeding half the annual saving which a good road would effect for every farmer.

In addition to the evident benefits which each person would enjoy from the construction of a good road in his vicinage, there is a probable one to be expected from the increase in the value of property adjacent to it, and the inducement to settlement which such a highway offers. There is no other consideration which affects the stranger more favorably than the thought of a good road to town, at all seasons of the year. If you wish to sell real estate quickly, you must provide pleasant streets which shall be comfortable at all times; and in what part of this country do the residents not ardently hope to sell out at an advance?

When any community shall have been moved to action and shall resolve to build better roads, it is very desirable to avoid the waste of the money which will be voted for highway purposes, almost certain to be the result of confiding its expenditure to the ignorant persons, who have generally been selected in rural communities for highway surveyors or path-masters. Road building is an art which has in all countries where there are good roads, called for the employment of the best talent; indeed, the reputations of some of the most distinguished engineers, have been due to their success in the construction of permanent highways. No doubt, a knowledge of how to build roads is now quite general among engineers; but we are certain from personal observation and experience that it has not taken possession of the ordinary country path-masters, who squander the taxes annually, with the least advantage to the highways. Of course, many of them have ability and intelligence and would learn how to build a good road, if they were to see one made; but we may be sure that no one will do it until he has learned how, either by experience or from example.

The necessity for such practical instruction in this most important art has influenced the Faculty of Cornell University, to make an arrangement by which the students of that institution and the people of that neighborhood will have the benefit of an extensive series of examples of the best road-building, from which we may anticipate results of great value to the people of Central New York, and perhaps, ultimately, to all the regions from which the university draws its pupils. Three of the professors, one of whom is the head of the engineering department, have been instructed to prepare plans and specifications for making perfect roads, by various methods, throughout the extensive grounds belonging to the University; taking care to select for each section the method of improvement most appropiate to its soil and other conditions; the several systems employed being afterwards indicated upon tablets, so that the wayfaring man may read and know how the piece of road he is traversing was built.

The plan of teaching by object lessons has been proved to be one of the most effective in all branches of learning to which it is applicable, and it will certainly impress even a somewhat bucolic mind with the advantage of a hard road, if he drives off a soft one in bad weather on to a hard one, and perceives that this last has been built over the same kind of soil which, at home, affords him no road at all. Such an object lesson as this every railroad company can afford to give to each community upon its line by building first-rate roads at all its stations, where now they are generally only ruts plowed in the soil by the loaded wagons which haul freight to and from the railroad, and are a shame to the management which suffers them. The railroad companies invite the public to bring business to their depots, they have the means, the knowledge, the materials, within easy reach whereby they can make the depots easily approachable at all seasons. A railroad company should also have the intelligence to comprehend of how great advantage to its traffic it would be if good roads were to be built from the country to its stations. Probably in no better way could it promote such a result than by building a piece of good road in the presence of all the people, for their use upon its own ground. The construction of such a road, if well done, would be

watched by every man and boy in the neighborhood, and every step in its progress would be noted, commented, and impressed upon the country folk for miles around, and, we cannot doubt, with useful effect.

The Drift of Railroad Legislation in Georgia.

The Georgia Legislature by a vote of 94 to 35 has ordered a general investigation of the railroads of the state. This applies particularly to the Richmond & West Point Terminal system, which has about completed its work of absorbing the railroads of Georgia, the Central of Georgia, the last of the great prizes, having recently passed into the hands of the Terminal. The Central is Georgia's own, however; and while in any scheme of centralization it is a property much to be desired, on the other hand its absorption by so powerful a system looks as if it were to be the last straw to break the camel's back. At any rate the transfer to the Terminal people has angered the Georgians beyond expectation.

The investigation provides for a searching inquiry as to whether the leases entered into have not gone beyond the provisions of the charters of the roads concerned. The present state of public feeling is such that the withdrawal of the Georgia roads from the powerful syndicate is not an unlooked for possibility. The legislature seems willing to respond to such requirements if need be. The governor's message recommends legislation to prevent unjust discrimination and oppressive rates and asks for investigation. The power of the Railroad Commission, already groaning under its burdens, will be enlarged. The Smith bill, making effective that part of the constitution which declares illegal and void any contract providing for the sale of shares by one corporation to another, whereby competition may be lessened or consolidation encouraged, has too good a chance to pass to be unnoticed at this early day in the session.

These features are not straws on the stream merely; they are currents in the ocean of public opinion that is turning against the railroads. They are all the more significant because the railroad problem of the South Atlantic States is rapidly centring itself in Georgia. The pivotal point in the development of the Terminal system lies within the State lines of Georgia, in Atlanta in fact. The fact that Atlanta is the leading commercial city in the South, the recent transfer of the Terminal headquarters thence from Washington, its traffic arrangement lately perfected with the Pennsylvania lines, and the probable arrangement with the Missouri Pacific lines for traffic between trans-Mississippi points and the South Atlantic seaports—all these show that the men at the head of the Terminal have chosen well their ground on which to press to completion their project of consolidation covering the states south of the Potomac and east of the Mississippi River.

It is noticeable that the fight is on legal lines. If, however, it is found that the parties to the leases have gone beyond their limits they will simply try it over again with surer effect. The people have seen too much of the benefits of consolidation to put up long with any disjointed system of disassociated roads devised by a commission. And, further, with consolidation in the air, the shareholders of smaller roads will find too many elephants on their hands to manage them themselves. The result in the end will be the same, only it will take more time and more roads will be ruined by the starving out process which the legislature can only prolong.

The Georgia Legislature does not seem capable of rising to the height of the argument at this stage of the work. It forgets that in great systems of railroads, as in the postal system, the heavy routes help out the lighter ones, which latter in themselves often could not be operated except at a loss. Consolidation distributes the burdens and benefits far more equitably than could ever be done under the old order of things, in which each different line looked out for itself.

The position of Georgia in the South is somewhat like that of New York in the North in her relation to other states; Georgia leads the advance, is the teacher of her sisters in some respects. But she is now at a point at which she may lose her prestige by an alarming development of hostility to a feature in railroad organization that has long since come to stay.

At the same time there is prospect of a two-cent fare law, how general it is yet uncertain; but the Southern Travelers' Association is pushing this point with considerable vigor before the Commission, and the Georgia Southern & Florida, now in the fight against the older roads, is playing the role of a suppliant seeking the privilege to charge that low rate.

Against all these aggressive measures the roads set up the plea of discrediting their securities in the market, and thereby jeopardizing the financial standing of the entire system. Such an effect would certainly communicate itself to the whole commercial community, and might easily be the first step in a general financial depression, in which Georgia would have most to lose.

Some of the evils which we have predicted in the past, regarding the probable results of the use of untried air brake systems, are made apparent by troubles with trains having mixed brakes. We refer to those systems which operate in a way of their own which tries the patience of trainmen and causes unnecessary delays. The only way to run cars with such brakes in trains with the Westinghouse is to cut them out entirely, as the action is not simultaneous, nor does it take place with the same degree. The graduation is not under control of the engineer, and the emergency is obtained oftener than the service application. Just now the private car companies are causing trouble with mixed brakes. Rather than to be the first they should be the last to try experiments. They should adopt what has been already approved by representative roads, and leave to the railroads themselves, with their large facilities and competent forces, all experimentation with unknown quantities. There are already many complaints made about the attitude of private car companies toward railroads, and the feeling of dissatisfaction will not be lessened by the practice which some of the companies have of buying and putting on their equipment the cheapest materials regardless of their efficiency. Recently one of these companies has stated that it will adopt a certain untried form of air brake for its equipment. Knowing the design of the triple valve the results are obvious; it will have a way of its own which will be hard to follow. Its course of action must be erratic, as it has no definite regulation. It may do one of several things at any time, or do them all at once. The whole plan of the device is to avoid existing patents, and while issuing circulars claiming to do what all brakes should do, in the matter of action, the promoters of the devices at the same time issue triples, which have an action so entirely different that, as we have said above, it is impossible to use them in a regular air brake train, and they must invariably be cut out. Perhaps this would not be so bad if the trainmen could tell which brake to stop off, but that will only be determined after there has been a delay or a break-in-two caused by the erratic action of the improper triple valve. It is dangerous to use the vertical plane coupler, which is bought in the open market without other discrimination than that of price; but it is vastly more dangerous, and is even reckless, to take up an air brake system which has not been tried and improved by thoroughly competent railroad men.

Last spring Mr. A. Schreiber and Mr. G. C. Powers made a journey from New Orleans to Mexico, Central and South America, under instructions from Mr. Stuyvesant F. Fish, President Illinois Railroad Co. The object of the journey was to investigate the trade conditions of the countries visited and to look into the project of establishing a line of steamers to run from New Orleans in connection with the Illinois Central. This rail road runs its trains from Chicago to New Orleans, and from Chicago reaches out northward to Madison, Wis., and westward to the Missouri River. Thus it commands the whole Mississippi Valley and it would seem to be only logical that it should extend its connections through New Orleans, "the out port of Chicago," directly to the southern countries. It appears an obvious step for the Illinois Central to put on its own line of steamers and divert to New Orleans some of the trade, Mexican and South American, passing through New York. It was with such an object that Mr. Fish sent out his expedition. Their report is just received. They made quite an extensive itinerary into Mexico, Guatemala, Costa Rica, Ecuador, Peru, Venezuela and Colombia. The sum of their report is:

From the point of view of direct trade relations between Chicago and Spanish-America via New Orleans, the above statement points to the following conclusion, viz.: That a large, profitable and immediately available trade can be established with Cuba and Mexico; that business with Central America may under certain conditions be increased; that an important traffic with Ecuador, Peru and eventually Chili, can be developed; that the possibilities of trade with Colombia are serious, and that the field in Venezuela, though now occupied exclusively by New York, may be disputed. Two steamers of suitable size, running from New Orleans to Havana, Progreso, Vera Cruz and Tampico, would secure a semi-monthly service between Chicago (via the Illinois Central R. R.) and ports in Cuba and Mexico. One steamer between New Orleans and Colon, touching at Greytown (Nicaragua), and Port Limon (Costa Rica), scheduled to connect with either of the lines plying between Panama and ports in Ecuador, Peru and Chili, and connected by an annex with the Caribbean ports of Colombia, would give a monthly service for business with the east and west coasts of Central America, the west coast of South America and the north coast of Colombia. One steamer from New Orleans to Laguayra, touching at Jamaica, with an annex taking Puerto Cabello, Maracaibo and Curacoa, would establish a monthly service for the traffic with Venezuela. First-class fast (15 knots) steamers, fitted up with a view to the comfort of travelers, would, on all the lines, do a large passenger business, particularly if arrangements could be made to issue through tickets to and from New York via Chicago.

The Baldwin Locomotive Works at Philadelphia will establish a test department of their own, which will be available to railroad companies desiring to have tests made of locomotives. This department will be equipped with the latest forms of apparatus and will be in charge of competent men who are continually employed in this class of work. They have been gradually working up to this step for some time past, and the introduction of compound locomotives has shown the advantage of it. Arrangements have now been made to establish this as one of the main departments of the works.

On the occasion of the Swiss bridge disaster we printed a table of a few of the worst railroad accidents on record (*Railroad Gazette*, June 19, page 434). Since that time the corrected accounts, as heretofore published in these columns, show that the number of persons killed at Mönchenstein was greatly exaggerated in the cable dispatches. We have also obtained accurate figures concerning a derailment in Russia in 1882, which was omitted from our table because the only available record seemed to contain too large an element of fiction. We therefore print herewith a revised table including these two accidents. This probably shows every train accident that has ever occurred in which over 40 persons were killed.

	Killed.	Injured.
Mallpois, Mex., June 24, 1881, bridge undermined	214	50
Chatsworth, Ill., Aug. 10, 1887, trestle burned	85	250
Armagh, Ireland, June 12, 1889, collision,	83	260
Belœil, Canada, June 29, 1864, open draw	83	(?) 200
Ashtabula, O., Dec. 29, 1876, bridge failed	80	60
Tay Bridge, Scotland, Dec. 28, 1879, bridge blown down	75	0
Mönchenstein, Switzerland, June 14, 1891, defective bridge	72	(?) 100
Camphill, Pa., July 17, 1856, collision	66	100
Mud Run, Pa., Oct. 10, 1888, collision	66	23
Mast Hope, N. Y., July 15, 1864, collision	60	150
Versailles, France, May 8, 1842, broken axle	52	50
Norwalk, Conn., May 6, 1853, open draw	46	30
Teherny, Russia, July 12, 1882, derailment	43	35
Angola, N. Y., Dec. 18, 1867, derailment	42	(?)

The signaling of the Fourth Avenue Tunnel, New York City, is to be completely remodeled, and the contract has been let to the Johnson Railroad Signal Company. The price we understand to be $16,000, but of that we have no official information. There is to be a renewal of the Sykes apparatus, with new signals and larger lamps, and the locking will embody a number of additional safeguards and improvements. The traffic is to be controlled from two sets of towers, one for northbound and one for southbound trains. Each tower will be equipped with a Johnson interlocking machine and improved block instruments. The whole design has been made in accordance with specifications prepared by Mr. C. H. Platt, the Manager of that portion of the New York Central in which the tunnels are included and over which the New York Central and New York, New Haven & Hartford trains are operated jointly.

Our attention has been called to the following item in Mr. Theodore Cooper's General Specifications for Iron and Steel Railroad Bridges, etc. Under Steel, page 21, section 137, is the following sentence: "No work should be put upon any steel at or near the blue temperature or between that of boiling water and ignition by hardwood sawdust." We suppose that Mr. Cooper would not admit the truth of a sentence which occurred in the editorial on Blue Shortness in our last issue, viz.: "We are inclined to believe that American engineers do not, as a rule, understand that blue shortness is of sufficient importance to cause them to forbid in their specifications blue working of iron and steel." At any rate, he evidently understands the matter.

NEW PUBLICATIONS.

Summer Tours.—R. W. & O. R. R.—The Rome, Watertown & Ogdensburg prints one of the best summer resort guides that we have seen. It has a number of advertisements, which are placed by themselves in the back of the book. All advertisements are somewhat of a nuisance in guide books which one wishes to put into his pocket or satchel, but in this book those which have some sort of relation to summer travel are in the majority, while those of white pine shingles and burglar-proof safes are few in number. The special merit of this work is an abundance of good pictures and large-scale maps of the cities through which the road runs.

The above publication and that of the New York Central & Hudson River came to hand after we had printed the article on summer literature in the *Railroad Gazette* of June 26. The New York Central book is a thick one. About one-fourth of its pages contain advertisements, and there is no reading matter among them; but there are several full page cuts of scenery which tempt the reader to turn his attention away from the main topic of the book to the Little Jewel Lamp, the Remington typewriters, etc. This book, in addition to the usual merits of the best works of its kind, has a large number of fine half-tone prints from photographs which are really unique and interesting. Besides those of natural scenery, hotels, etc., there are some good ones showing scenes on the railroad line near Little Falls, where four trains are passing at once. These photograpic pictures are of course immensely superior to the wood cuts which formerly characterized railroad literature. A photograph *must* be honest, but a wood cut made by an artist whose imagination can combine all the attractive features of a road's scenery in one view, despite the miles of desert that separate the mountains from the rivers, embodies an element of fiction that can hardly be regarded as profitable for the reader—or for the road. The summer resort literature received since the publication of our former article, does not tend to weaken our opinion that more accuracy is greatly to be desired in these works, but rather strengthens it. The statement that there are a half dozen good hotels in a town which really contains only one second-class, and two or three "no-grade" houses is little better than a positive misstatement.

Poor's Manual of Railroads for 1890. New York: H.V. & H. W. Poor, 1891. Price $6.

With the growth of railroads in the United States there is an inevitable growth in the size of this indis-

pensable work. This year it is, however, but few pages larger than last, and we notice no new features. The maps of individual systems, which were inserted for the first time last year, do not seem to have increased in number, somewhat to our regret, for they are very convenient when made with any regard for geographical facts. It would be difficult to say anything new of this issue, which we considered at much length in an editorial last week. The most salient facts which appear in the introduction were also published in our last issue. It is enough to say that the Manual easily holds its unique and undisputed place in railroad literature.

The Trackman's Helper.—By J. Kindelaw, Mitchell South Dakota; price $1.50. This is a pocket reference book for the practical trackman, and covers the usual ground rather thoroughly. In this second edition the book has been considerably enlarged.

TRADE CATALOGUES.

Allowable Working Loads for Phœnix Columns of Iron and Steel, for Buildings. Full-sized Sections, Details for Wrought Iron Caps and Connections. Published by Milliken Brothers, New York and Chicago. With the sanction of the Phœnix Iron Company.

The text of this pamphlet is a short but useful essay on modern practice for metallic columns in buildings. The faults and weaknesses of cast iron are pointed out, as well as the advantages of rolled material. In considering the best form of rolled column the natural preference of these makers is for the closed round strut, and the Phœnix column is claimed to be the most perfect form of strut yet devised. The well known objection of bridge builders to the use of this column, viz., that the inside of it is inaccessible for painting and inspection, does not obtain in buildings, where the columns are entirely inclosed in fireproof construction. One of the numerous plates which accompany the pamphlet shows the tests of square-end columns made at Watertown Arsenal some years ago for Clarke, Reeves & Co., in which the Phœnix section and many others are compared.

The manufacturers have recently increased their plant, and are now prepared to furnish steel columns of the same sections as of iron, and to deliver either iron or steel as promptly as may be required. Plates are appended showing all the dimensions and weights of columns from 3¼ up to 14⅝ in., inside diameter. Other tables show allowable working loads for both steel and iron columns of these various weights and sections. Still other plates show designs for various connections useful in building construction and for methods of fireproofing. Appended are direct process reproductions of photographs of many interesting buildings in various stages of construction, showing not only Phœnix columns, but other iron work designed and contracted for by Messrs. Milliken Brothers.

The Phosphor Bronze Smelting Co., Limited. No. 512 Arch street, Philadelphia. Price List No. 8.

This is a revised price list dated July 1, 1891, of the well-known products of this house. The list includes roll and sheet phosphor bronze, wire, wire ropes and wire cloth, wood screws, etc.

Foreign Railroad Notes.

During a strike of coal miners in the mines near the Rhine last spring, the Prussian State railroads reduced the rates on coal shipped from the Silesian and from North Sea ports where English or other foreign coal was received to those places which ordinarily receive their coal supply from the Rhenish mines, apparently not fearing that the miners might boycott the railroads for their interference.

A writer in the *Journal of the German Railroad Union*, discussing the periodical complaints of a lack of freight cars, gives some facts concerning the service of such cars in Germany, which may, perhaps, lead us to be less discontented than we are with the work we get out of ours. In 1889, he says, which was an average year, a German freight car ran on the average only 11,300 miles, an Austro-Hungarian car 11,824 miles. Counting the average speed of a freight train 10 kilometres (6¼ miles per hour, the car was engaged in transportation 72 days of the year in Germany and 79 in Austria-Hungary while the other 293 or 286 days it was standing still. This writer's chief suggestion of a remedy for this state of things is the enlightenment of the shippers as to the facts of the case, and urging on them to ship as much of their freight as possible at the season when the railroads are not busy. He does, however, timidly suggest that a reduction of rates on certain freights might be made in the dull season—a sort of high treason this to the German freight tariff policy—and mentions a case where such reductions were made on summer shipments of coal with good effect. In Germany the course of traffic is much the same as it is with us; from the 1st of September till the end of the year the demand for freight cars cannot be satisfied, but during a great part of the rest of the year it is difficult to find track room to store the idle ones.

The same journal notes the utilization of the different classes of passenger cars in Belgium. The number the cars will seat and the average number occupying them in 1889 were, in express trains and ordinary passenger trains:

	Express Trains. Class			Passenger Trains. Class		
	1.	2.	3.	1.	2.	3.
Places for.....	24	40	50	24	40	50
Av. No. occupied.....	7	14	9	2	9	12

It will be noticed that in the express trains the proportion of passengers to accommodations is least in the third class, but in the ordinary passenger trains the reverse is the case.

The French railroads naturally had an extraordinary traffic in 1889, on account of the Exposition. It was not expected that earnings would be as large in 1890, but in the first half of the year they were actually larger. For the entire year there is a decrease, but it is a very small one. The earnings were as follows for the six great systems and the state railroads:

	1890.	1889.	Decrease.	P. C.
Earnings.....	$216,867,137	$217,563,068	$1,298,069	0.6

There was a small increase in mileage meanwhile (120 miles 0.6 per cent.), but the recent additions to the French railroad system add very little indeed to its traffic. The total length making the above earnings was 20,427 miles, and the average earnings per mile $10,617. These latter vary greatly over the different systems. The state railroad earned only $4,181 per mile; the Paris, Lyons & Mediterranean, whose system is much the largest (5,082 miles), earned $13,004 per mile; the Northern railroad $16,036.

Last spring the administration of the Austrian state railroads applied to Austrian and also to German manufacturers for bids for a quantity of tires. When the bids were opened it was found that a German factory, in spite of the duty and freight charges, had bid considerably lower than the lowest Austrian offer, it being understood that the Austrian works had pooled, expecting to secure all Austrian orders at a comparatively high price. The government authorities, unwilling that all the work should go out of the country, offered an Austrian bidder half the order at the price offered by the German bidder. Hereupon the Austrian bidder had the face to say that if it could have the whole order it would fill it at the German price, but that it must decline a share of the job. But as the authorities insisted that it could not refuse work to a firm which it had invited to bid, when its offer was the lowest, and declared that the German works should have the whole if the Austrian works declined to furnish part, the latter finally condsecended to accept a contract for halfthe supply.

TECHNICAL.

The Heavy Ordnance Contracts.

Upon the recommendation of the Board of Ordnance and Fortifications, Acting Secretary Grant has awarded the contract for 100 high power guns to the Bethlehem Iron & Steel Co., of Bethlehem, Pa. The aggregate amount of the contract is some $3,580,373.35. The board reported that it was not necessary that the guns should be turned out at a rate greater than carriages and emplacements could be provided, nor that the guns should be procured by contract, to the displacement of the plant and skilled labor already on hand and provided for at the Watervliet factory. The board also reported that in view of the appropriations necessary for the maintenance and operation of the gun factory; for forging, etc., to keep it in operation, for carriages, for emplacements, for mortars and carriages therefor, and for other necessary objects of defense and armament, it is not in the interests of the United States that the contract guns should be hastened to such a degree as to possibly cripple appropriations for other necessary objects. It was advisable also to accept that bid of the Bethlehem company, which, conformably with the foregoing views, will assure the establishment of a private gun manufacturing plant, within a reasonably short period, at the least possible cost to the United States for the plant.

The board finally recommended that a contract be entered into with the Bethlehem company for the manufacture of 100 breech-loading, single charge, built up, forged steel rifle guns as per Schedule E of its proposal of July 11, 1891. Instead of requiring that 350 rounds of ammunition be included with the first guns of each class, the board thought that 10 rounds would be enough for a test.

The contract prices for guns are as follows: Twenty-five 8-in. guns of the above mentioned character at a cost of $17,246.55 each; 50 10-in. guns of same character at a cost of $35,747.58 each; 25 12-in. guns of same character at a cost of $54,473.22 each. The first of the 8-in. guns is to be delivered in two years, the summer of 1893, the remaining 24 to be delivered at regular intervals, the last being delivered within seven years of the acceptance of the first sample gun. The first of the 10-in. guns is to be delivered in two years and two months, the remaining 49 to be delivered at regular intervals within nine years and six months of the acceptance of the first sample gun. The first of the 12-in. guns is to be delivered within three years and the remaining 24 to be delivered at regular intervals within nine years from the acceptance of the first sample gun. The whole contract, therefore, will not be completed till thee xpiration of 12 years, or about 1903.

The reduction in the amount of the contract by the change in the amount of ammunition to be furnished will hardly cause any dispute as to its final acceptance by the Bethlehem company in view of the fact that the actual net cost of such guns as are called for is already known. The profit to the Bethlehem company on the contract as it now stands, if they meet with any ordinary success with the work, will be very great in view of the fact that the company is to get almost double the amount that the same work has cost in government works. But the government yards have already served an apprenticeship at the work which the private yards have yet to learn and gain experience in. Besides this the government yards take no risks when making the guns, the loss is not theirs when failure takes place. The private yards must risk a test of the highest order and a complete renewal in case of failure. The contractor must provide against such contingencies, and must feel assured not only against loss of any kind, but must know that a handsome reward or profit is in the work if it is at all successfully accomplished, and meets the iron clad conditions exacted by the government and its officials.

The amount of money that finally gets into the pockets of the company will hardly do more than pay them for for their services and for the establishment of a plant, which government orders alone can keep in profitable existence. The knowledge of the fact that a supply of heavy ordnance can be had from private yards and capital should be paid for by the government and that generously. It is one of the greatest needs of the country. The government works should be kept equally busy and experienced with those of private parties.

Rapid Transit in New York.

The plans for the rapid transit construction in New York City which have been elaborated by Mr. W. E. Worthen and Mr. W. B. Parsons are said to be completed and in the hands of the Commissioners. The plan of Mr. Parsons provides for four tracks, arranged in two stories and a gallery for pipes, and the like, between them. The track structures are to be of masonry, with iron or steel roofs and concrete foundations. There will be an up-way track and express track on one side of the street and down tracks on the other, the way track being above the express track. It is designed to arrange for entrance into the pipe gallery through the railroad tunnel, and thus provide for a permanent pavement for Broadway which need not be disturbed. Undoubtedly this form of construction would be very expensive, but it makes the one provision that the final solution of this very important problem must contain, that is the one which makes it unnecessary to disturb the pavement. The plan submitted by Mr. Worthen has four tracks on one level, and does not provide for the pipes and subways. It will be cheaper than Mr. Parsons' plan and also less complete. We shall refrain from any discussion of these plans until a later issue.

A Compressed Air Duster.

A wandering railroader has discovered at Portland Ore., a novelty in the use of compressed air for cleaning the inside of passenger cars. In the shops of the Union Pacific at that place the passenger car yard is piped, in connection with an air-compressing plant, and at convenient intervals an ordinary garden hose with a nozzle is attached to the piping in such a way that the nozzle can be conveniently drawn into a passenger car through a window, where the air, under 50 lbs. pressure, is used to blow the dust out of every possible lodging place, including the plush upholstery.

Effect of Water on Lead Pipe.

A very remarkable case of danger from water in contact with lead, where neither the conditions of the drainage area nor the results of chemical analysis would arouse any suspicions as to safety, was reported by Dr. Elwyn Waller at a recent meeting of the American Chemical Society. The water in question came from creeks in the mountain districts of Kentucky. Analyses of samples "one" and "two" were as follows, the acid radicles being distributed among varying quantities of the usual alkali and alkali-earth metals, with also some silica, iron oxide and alumina:

	Parts in 100,000. I.	II.
Odor when heated to 100° F.....	None.	None.
Chlorine, in chlorides.....	0 0311	0.0360
Phosphates.....	None.	None.
Nitrogen, in nitrates.....	0 0165	0 0247
Free ammonia	0.0004	Trace.
Albuminoid ammonia.....	0.0046	0.0016
Temporary hardness.....	0.9500	0.7500
Permanent "	1 4000	1.3000
Organic and volatile.....	1.3000	1.4000
	3.7026	3.5323

As a further test, sections of 1-in. lead pipe, each 1 in. long, freshly scraped, were put into about a pint of each sample, and for comparison a piece of the pipe was put into an equal quantity of Croton water. A slight cloudiness occurred in No. II. in 24 hours, a still further discoloration in No I. and none in the Croton. Fresh samples were put into bottles with the lead, and left, with glass stopples tied down, for several months. At the end of that time the piece of lead in the Croton water was blackened, and had developed one or two spots of adherent white incrustations. Sample of water No. I. was whitish in color, with some detached white sediment, while No II. was decidedly milky, and contained a half inch of detached sediment, the action upon the lead apparently going on indefinitely, the scales becoming detached as fast as formed. A similar case was reported some years ago by Prof. Frederick Penny, in his experiments upon the water of Loch Katrine, which showed an almost identical composition by analysis.

White Metal Alloys.

The following alloys are used as lining metals by the Eastern Railroad of France:

Number.	Lead.	Antimony.	Tin.	Copper.
1	65	25	0	10
2	0	11.12	83 33	5.55
3	70	20	10	0
4	80	8	12	0

No. 1 is used for lining cross-head slides, rod brasses and axle bearings. No. 2 is used for lining axle bearings and connecting rod brasses of heavy engines. No. 3 is used for lining eccentric straps and for bronze slide valves. No. 4 is a special alloy for metallic rod packing.

Hydraulic Transfer Table at St. Lazare Station, Paris.

Among the hydraulic machinery at St. Lazare Station, of which a general description has been already published in the *Railroad Gazette*, there is a transfer table which has some interesting features. There are two horizontal working cylinders placed in line and facing each other, so that one plunger serves for both. This double plunger carries in the middle of its length two groups, of three pulleys each, around which the chains are led. Two chains are used, one for each cylinder, which are led from the transfer table in opposite directions, around guide pulleys, and thence around the pulleys carried by the plungers and two fixed pulleys on the back ends of the cylinders, in the same manner as that commonly used for hydraulic elevators having horizontal cylinders. The stroke of the plunger is 12 ft., and, as the ratio of the chain tackle is six to one, the total travel of the transfer table is 72 ft. The plungers are about 43 in. in diameter. The lever for operating the admission and discharge valves is placed at one side of the transfer pit. Water under pressure is admitted to one cylinder or the other, according to the direction in which it is desired to move the table, the opposite cylinder being, of course, at the same time connected to the return pipes. Detailed drawings of this machinery were published in the *Revue Générale des Chemins de fer* for May, 1891.

The Spirograph.

This simple divice, the invention of a Frenchman, enables curves and spirals to be drawn with an accuracy equal to that of a circle described by a pair of compasses. It is in reality only a modification of the compass, having one leg vertical, and the other inclined and attached to a revolving sleeve near the top of the vertical leg by a bent steel spring instead of an ordinary joint. In the foot of the vertical leg is inserted a dry point, and a thread fastened to the foot of the inclined leg, which latter also carries the marker, is attached to the circumference of the dry point. By holding the vertical leg firmly with one hand so that it cannot turn, and with the other hand revolving the inclined leg, the thread is wound around the dry point, causing the marker on the inclined leg to describe a spiral. By using dry points of different diameters the operator can vary the curves as desired.

Electrical History.

As an interesting contribution to the history of electric power transmission and electric traction, the *Moniteur Industriel* cites the fact that on Jan. 16, 1855, Henry Gilbee was granted a patent "for the employment of two magneto-electric machines united by wires, one of the machines being put in motion by any convenient power, and generating a current which causes rotation of the second machine." The inventor, it would appear, foresaw also the establishment of a number of motors along the line of a conducting wire taking power from it. The inventor was M. Bessolo, a business arrangement having been entered into by him with Mr. Gilbee for the purpose of commercially developing the patent. Possible applications of the latter were, at the time, pointed out to be the operation of machine tools, and electric traction with underground or overhead conductors or with the rails serving as conductors. It would appear from this that all systems of electric traction have thus been antedated by Bessolo's early patent of 1855.

Progress in the Electro-Metallurgy of Aluminum.

In the more recent experiments upon the reduction of aluminum by electrolytic methods, Minet employs a smaller steel crucible, having an internal lining of carbon which serves as the negative electrode. The difference of potential between the two electrodes is 4.55 volts, and the production is 31.9 grammes of aluminum per H. P. per hour, or an expenditure of 31.3 H. P. for every kilogramme of aluminum. It is thought that the difference of potential can be reduced to four volts, in which case there will be no electrolysis of the sodium chloride, and the yield will probably come up to 70 per cent. of the theoretical quantity. This loss of 30 per cent. is attributed to the action of the fused fluorides on the aluminum. When alloys, instead of the pure metal, are made, this loss is not experienced, the aluminum combining directly with the alloying metal which forms part of the electric cell.

Mr. Thomas L. Wilson, of New York, proposes to use a hydro-carbon gas as a reducing agent instead of the solid carbon, thereby avoiding loss of energy through the absorption of heat consequent upon converting the solid carbon to the gaseous state. He also claims to increase the rapidity of the action by applying pressure to the gaseous contents of the cell during the operation.

THE SCRAP HEAP.

Notes.

The amount of the shortage of Sylvester Young, defaulting cashier of the Newport News & Mississippi Valley Railroad at Lexington, Ky., is now known to be at least $38,000, instead of $25,000, as at first supposed. Further investigation may add slightly to this. Young has not been heard from.

Mr. Frederick Harvey has secured an injunction restraining the Atchison, Topeka & Santa Fe from running dining cars west of the Missouri River. He has a contract for restaurants and lunchrooms on those lines. He claims that the plant has cost him $150,000 that he daily feeds 5,000 people, and that he established these places under great disadvantages and hardships. The injunction was granted by Judge Driggs in the Circuit Court. The railroad company will move for a dissolution.

A party in a private car recently came from San Francisco to New York in 4 days 16 hours and 50 minutes. The route was via Southern Pacific, Union Pacific, Chicago & Northwestern, Lake Shore & Michigan Southern and New York Central.

The last two weeks have seen some mild disturbances among employés, but nothing of consequence. The Atchison switchmen at Albuquerque were out on a strike for a week but returned to work with no concessions from the company. Enginemen on the elevated road in Kansas City who were discharged some time ago, have returned to work at $2.70 a day, a settlement having been effected by Chief Arthur. Mr. Arthur has been called to Chicago to arrange a difficulty with the enginemen on the Louisville, New Albany & Chicago.

Thirteen engineers, firemen and brakemen on the Cincinnati, Wabash & Michigan were discharged for smuggling beer into the cabs and cabooses, and drinking it while on duty.

The circular issued some weeks ago by the Lake Shore management strictly forbidding the use of intoxicating drinks by employés has given offense to many saloonists, who will, it is said, boycott the road wherever possible.

Foreign Notes.

Hammerfest, in Norway, the most northerly city in the world, has been fitted with an electric light installation by the Thomson-Houston International Electric Company. Power for the dynamos is obtained from a waterfall about a mile distant from the city. Arc lights are used for illuminating the streets. For lighting private dwellings the alternating current and transformers will be used. An alternating current dynamo is now being installed, and will develop a current of 35 ampères and 1,000 volts. During the winter season the plant will be in operation continuously day and night, and will thus, it is thought, work under as exacting a set of conditions as any electric light central station in the world.

The steam tramway between Paris and St. Germain, France, is one of the few lines now in existence on which fireless locomotives are in use. The total length of the line is about 13 miles. The engines, as described in the *Revue Générale des Chemins de Fer*, are of the Lamm-Francq pattern. The cars are each lighted by four incandescent lamps supplied with current by storage batteries. For a train of three cars these batteries will furnish sufficient current for about seven hours. In winter the cars are heated by steam from independent small boilers placed under each car. Twenty trains a day are dispatched each way on the line, the trip from end to end occupying about one hour and 25 minutes.

The St. Mande Accide t.

We have already stated the grounds for disbelief of the story that the wreckage in the St. Mandé disaster was set on fire by the explosion of a Pintsch gas tank. The telegraphic dispatches heretofore received on that point have been from persons interested in this system, but a recent issue of the *Courrier Des Etats-Unis* contains the following passage, which is apparently disinterested: "The locomotive of train No. 116, D (second section), which was running backwards, set fire to the mass of débris of every kind, and the burning coal from the fire-box of the engine was scattered over the broken carriages in the midst of which lay the victims of the accident." The latest statement is that there were 34 deaths in all.

Freight Carried by German Railroads and Waterways.

There have been some contradictory assertions as to the relation between water borne and railroad freights in Germany. Some authorities have claimed that as much as 30 per cent. of the freight was forwarded by water, but *Kuhlow's* thinks this is too large a proportion, and publishes the following table, showing in metric tons the amounts of heavy freights forwarded:

Goods.	Railroads.	Waterways.	The Rhine.
Pit coal	54,402,572	7,302,782	6,229,081
Lignite	9,938,755	388,056	.....
Pig iron	4,225,525	633,080	395,555
Bar iron	3,491,877	433,280	335,509
Wheat and chaff	4,182,844	1,153,368	632,654
Rye	2,762,160	1,601,656	588,653
Meal	4,806,280	676,281	149,143
Total	83,810,013	12,186,103	8,330,595
Water transport added	12,186,103		
Altogether	95,996,116		

This shows that the claim previously made was too large, and that only 12.7 per cent. of the above mentioned freights was forwarded by water. The waterways are in length 22 per cent. and the railroads 78 per cent. of the total length of the transportation routes. Von Sympher, however, who represented the Central Union for the Improvement of German River and Canal Navigation at the Manchester meeting of the International Congress on Inland Navigation, held last year, says: "It is shown by the figures for 1885 that 4,800,000,000 tons of goods were carried along the waterways, which measured 10,000 kilometers; in other words, 480,000 tons per kilometer within the territory under observation; 14,000,000 tons were received, and 12,000,000 tons sent off." The first mentioned sum is evidently, from the context, intended for ton kilometers, as it is immediately stated that "about three-fourths of the total, viz.: 3,535,000,000, ton kilometers fell to the share of the seven large rivers, the Memel, Vistula, Oder, Elbe, Weser, Rhine and Danube, measuring 3,000 kilometers, and the mean distance of transport was 350 kilometers or 220 miles. This gives very nearly 14,000,000 tons for that year. The Rhine, which is navigable for 566 kilometers, is credited with 1,587,000,000 ton kilometers, or over one-third of the total, having carried over 4,500,000 tons per kilometer over part of the river.

The tons carried one kilometer on all German railroads in 1885-6 is set down at 16,600,000,000, so that the freight traffic by water was 23 per cent. of the total movement. The discrepancy in statements probably arises from the fact that two different things are referred to, the average haul on the waterways having been 350 kilometers, as against 166 on the railroads. In 1875, according to the same authority, the relation was as below:

	Ton-kilometers.	Average haul.	Per-centage.
Waterways	2,900,000,000	280	21
Railroads	10,900,000,000	125	79

These figures, on the whole, do not seem to justify *Kuhlow's* in deducing an argument against the further improvement of German waterways.

Mileage of Conductors.

A Boston & Maine passenger conductor says that in a quarter of a century he has traveled 1,039,160 miles. This statement has brought out several other records. Conductor Joseph H. Missimer of the Reading has covered 186 miles daily since 1868 and for two years he made 211 miles daily. This credits him with 1,597,720 miles. Conductor S. G. Boone, who recently left the Reading service, lays claim to 2,847,000 miles. Tip Layton, a sleeping car superintendent at Indianapolis, has kept a record of his journeyings up and down the face of the earth since 1863. It foots up 2,338,246 miles.

A Big Scrap Heap.

P. J. McArdle, who runs one of the largest junk yards in the world on his island below Albany, N. Y., has purchased fifty old locomotives from the New York Central & Hudson River Railroad for scrap-iron.—*Exchange.*

The German Iron Trade.

The *Colliery Guardian* gives the production of pig iron in Germany for 1890, as 4,563,025 metric tons. The make of the four principal producing iron countries for the past six years has been as below:

	United States, Gross tons.	Great Britain, Gross tons.	Germany, Metric tons.	France. Metric tons
1885	4,044,526	7,297,295	5 687,433	1,630,618
1886	5,683,329	6,870,665	3,528,658	1,507 850
1887	6,417,184	7,441,927	4.023.953	1,610,851
1888	6,489,738	7,898,634	4,337,121	1,688,976
1889	7,603,642	8,245,336	4,387 504	1,567,522
1890	9,202,703	7,904,214	4,563,025	1,970,160

For some years, and up to about 1885, the German production of pig iron was very close to that of the United States, and during that year and a part of the next they hoped to surpass us, but lately they have depended more and more on a foreign supply, as is shown by the subjoined table of exports and imports:

Years.	Excess of exports, Tons.	Excess of imports, Tons.
1885	27,089	.....
1886	133,429	.....
1887	108,905	.....
1888	.....	51,715
1889	.....	164,586
1890	.....	246,858

As a matter of fact the United States is about the only country which has made any gain in production, during the time under consideration, important enough to influence prices.

The difficulty with the German pig iron production lies in the fact that their ores and fuel are not near together, and their freight rates are still high for long hauls of either coke or ores. The low cost of their labor which enabled them to import some 300,000 tons of pig iron from England, and return a considerable portion in the form of finished products, is not of sufficient weight to counterbalance the disadvantage of costly transportations.

The Minnesota Iron Mines.

It is announced that the capitalists now in control of the Minnesota Iron Co., Duluth & Iron Range Railway Co., Chicago & Minnesota Ore Co., Chandler Mining Co., Minnesota Steamship Co., and in fact the Illinois Steel Co., will in a short time unite their interests, as far as the iron mines are concerned; about 90 per cent. of the Chicago & Minnesota Ore Co.'s stock being committed to an agreement to sell on a basis of one and a quarter shares of the Minnesota Iron Co.'s stock for one of theirs. This arrangement will, if consummated, make a very powerful combination, with capital and territory enough to enable them to figure among the great ore producers of the Lake Superior region.

The New Power Building of the Lackawanna at Hoboken.

The Delaware, Lackawanna & Western is working on a new building at Hoboken, N. J., which, as already reported, is to contain plants for electric and steam plant and a Pintsch gas plant for lighting the cars. The building will be of brick, with iron roof. The space for each plant will be as follows: Gas plant, 42 × 47 ft., with 25 ft. extension, and one large gas-holder; for boiler plant, 65 × 40 ft.; for dynamo-room, 40 × 40 ft. The gas plant will have a capacity of furnishing 24,000 cu. ft. daily, which is sufficient to light 500 passenger cars. The boiler-house will have two batteries of four 100-H. P. boilers each. They are to be horizontal, forge steel, tubular type, 66 in. in diameter by 16 ft. long; ⅜ and $\frac{7}{16}$ in. plate being used in constructing them. There will be two independent stacks, one for each battery. These boilers will furnish the steam for heating the cars while in the station, for running two gas compressing engines, and also for running three 100-H. P. engines for electric lighting. Grattan & Jennings, of Buffalo, are the contractors for the buildings. The boilers are being built by C. R. Vincent, of 15 Cortlandt street, New York City. P. H. Brangs, electrical engineer of the road, is supervising the construction of the building.

Railroad Projects in San Salvador.

The government of San Salvador has authorized Messrs. Paul Orellana and Manuel Trigueros to build a railroad from San Salvador to Santa Tecla, to be completed in two years. The government has also been authorized to make a contract for building a state railroad between Santa Anna and Ateos, connecting with the line already in operation.

Norwegian Shipping Interests.

The merchant marine of Norway at the present time is estimated to reach 1,711,081 tons. Of this amount 1,500,000 tons is embraced by the fleet of sailing vessels. The steamship fleet, however, is rapidly growing, the increase during the year 1890 having been 43,000 tons, distributed between 75 new ships. Of this number 45 were built in Norway, the remaining 30 having been the product of the shipyards of England and Scotland. The centres of shipbuilding in Norway are Bergen, Christiania, Stavanger, Christiansand and Trondhjem, Bergen figuring most prominently as the place of construction of 10 vessels. A new shipbuilding yard for iron sailing ships has been started at Faevig, near Arendel. It is said that the Norwegian work has been proved fully up to the standard of the best in England, but it is feared that the decreasing freight rates, coupled with the purchase of old ships abroad, will have a serious influence upon the shipyards, reducing them to depend upon repairs for their future existence.

Insulated.

Wagg—We had a terrible thunder storm as I came up in the train this afternoon.

Wooden—Weren't you afraid of the lightning?

Wagg—No; I got behind a brakeman.

Wooden—Behind a brakeman? What earthly good did that do?

Wagg—Why, he was not a conductor.—*Boston Courier.*

Asphyxiated in a Tunnel.

A press dispatch of July 30 gives particulars of a peculiar accident to a locomotive runner, as follows: Engineer Rochefort, of the south-bound express, to-day met death in an unusual manner in tunnel 14, sixteen miles south of Ashland, Or. Two engines are required to take the train over the Siskiyou Mountains. Rochefort had the front engine. When the train was nearly through the tunnel the coupling between the mail and express cars broke. Twenty minutes were consumed in making a new coupling, during which time the smoke and gas from the second engine blew directly into the cab of the one ahead. It was decided to back out of the tunnel, and when the train stopped outside the engineer and fireman of the front engine were missing. Search revealed the engineer lying dead by the track with his arm cut off. Fireman Fitzpatrick was lying unconscious by the track, but revived half an hour later. Both got off the engine to escape suffocation, and were asphyxiated before they reached the ground. Rocheford fell with his arm across the track, and bled to death when it was cut off.

A Note on Tin Plate.

In an article on the tin-plate trade the *Colliery Guardian* says it was known to be existent in Germany previous to the beginning of the seventeenth century. Antiquity, however, reveals the knowledge that tinned vessels were used so early as the days of Pliny (23 A. D.). The tin, most of which came from the Cornish mines, was transported by the Phœnicians to southern Europe and the East, where it was utilized for coating iron and other purposes. The industry has probably been the most profitable of British industries during late years. Since 1874 there have been only two years, 1885 and 1889, in which there has been any decrease in the exports of tin plates from Great Britain. The increase of works is given by the *Guardian* as follows: 1850, 34; 1860, 40; 1870, 59, and in 1885 there were 96. There are now 94 works with 500 mills, 11 of the works having 10 to 13 mills each. All of these works (except 21, with 105 mills) were closed during the month of July. It is predicted that "the tin-plate trade of the United Kingdom—at any rate so far as the United States are concerned—has reached the zenith of its power."

Paradise of Deadheads.

The Southern Pacific company doubtless runs some trains on which the least fare is collected in this country. The main station at Oakland is on "the mole," a long fill extending some two miles into the bay. Passengers reach it from San Francisco by a four-mile ferry. There are several stations in Oakland and suburbs, and a

great many suburban trains are run in several directions. The trains run right through the business streets, and by some agreement made in securing the original franchise the company is debarred from collecting any fare in Oakland. People who come over in the boats pay 25 cents for a round trip, and can get off at any station in Oakland. It is a regular thing for people of all classes to crowd upon the trains going and coming and use them just as they would free street cars. Nurse girls with three or four children, and young people out for fun, ride back and forth over several miles of track, and no fare is asked. The road also runs a number of "laborers' trains" between Sacramento and San Francisco, 135 miles, the fare being very low—$1.50, we believe. This is also one of the original promises that the company would like to get rid of, and therefore accommodations are rather meager. The seats are all plain pine boards, in the oldest and poorest coaches, and the seat backs are boards only about 10 in. high. It is cheaper for a tramp to have a stateroom on this train than to ride on a truck.—*Locomotive Engineer.*

An Employees' House.

The Baltimore & Ohio is erecting a large building at Brunswick, Md., for the comfort of its employés. The lower floor will be used as a lavatory, with rooms in which cots will be placed. The upper floor will be fitted up as a reading room and a hall, and will be under the supervision of the Baltimore & Ohio Young Men's Christian Association.

The Color Line.

The separate coach law in Texas is not altogether acceptable to the natives. A recent editorial in an Austin paper says that it is very difficult to say who is a negro, and that the law has served only to put the railroads to trouble and expense and the traveling public to inconvenience. The editor adds: "Of what use is the law anyway? It excludes negroes from the car occupied by whites but allows Mexicans, Indians, drunken brutes, bullies and filthy white men, who remove their boots and whose feet, under such circumstances, could give a limburger cheese or a Houston sewer points on disseminating outrageous and nauseating smells. Under a recent decision from the Attorney-General's office it also compels a sheriff taking a negro prisoner to the penitentiary to go by private conveyance or walk. The railroad cannot carry them so that the officer can guard his prisoner. This law is but another exhibition of magnificent idiocy displayed by the twenty-second legislature."

New Stations on the Central New Jersey.

The Central Railroad of New Jersey has plans completed for new stations at Lakewood and Westfield, N. J., and has others in preparation for stations at Elizabeth and Bergen Point. The Lakewood station will be one of the finest on the road. The exterior of the station will be built of cream colored Trenton sandstone. The exterior woodwork will be of hard pine. The interior will be finished in oak and the rafters, roof and trusses exposed to view. The extreme length of the building will be 90 ft. and its width 35 ft. The general waiting-room will be 40 × 32 ft. The station will have entrances at the sides, as well as in the front and rear. At the rear will be a *porte cochere* with a width of 15 ft. in the clear. The platforms will be paved with granolithic pavement. Peabody & Stearns are the architects. The estimates for the Westfield station are now being received. The building will be 73 ft. long and 33 ft. wide. The style of architecture will be Gothic, with the central elevation and projections front and rear. The structure will be built of New Jersey sandstone from the Stockton quarries. The trimmings will be of Indiana stone. A platform 10 ft. wide of granolithic pavement will surround the station.

The new Elizabeth station will be built in fulfillment of a promise made the Common Council some time ago when that body granted the company permission to sink Morris avenue for its track. The station is to be commodious and will be erected in two sections, so that there will be practically two stations of brick or stone. A tunnel or underground passage will connect the two sections. The station will probably be begun about Oct. 1.

The building at Bergen Point will cost about $16,000, and will be constructed of stone. The main building will be 78 ft. long; surrounded by an overhanging roof, and having a *porte cochere*. The total length of the structure is to be 94 ft. The width is planned to be 37 ft. 4 in. The interior of the waiting room will be finished with hard wood. Other new stations are being built at Communipaw and Van Nostrand avenue.

Aluminum at 50 Cents a Pound.

It was only a short time since that the price of aluminum was dropped from $6 to $2 per pound and now the Pittsburgh Reduction Co. has dropped the minimum price to 50 cents. As the Cowles company were permitted by the order of court to follow the price made by the Pittsburgh Reduction Co., they also announce a price of 50 cents for ton lots. This will bring the material into economic use for kitchen utensils and many other purposes, so that there will be a market for all that can be produced.

Government Railroads in Russia.

A Russian correspondent of the *Eisenbahn Zeitung*, speaking of the acquisition of different Russian railroads by the govenment, says:

It is not more than 10 years since the government inaugurated the policy of buying up private railroads and of building new lines. At the present time 37 per cent. of the Russian railroad system is government property. With the beginning of the present year the purchase of two large railroads by the government was consummated. The purchase of one of these lines, the Kursk-Chorkow-Atzow road, is considered a most commendable example of government policy. The road was opened in 1869, is about 500 miles long, and the most important connecting link between the northern and western parts of Russia and the sea of Asow. It is on this line that the accident to the royal train occurred in 1888, in which 60 persons were killed and wounded. The main source of revenue of the road is in the transportation of minerals from the Donetz district to various parts of the empire. The second line, known as the Libau-Romny road, is about 838 miles long, was opened in 1871, and connects the south of Russia with the Baltic Sea. Grain transportation constitutes the bulk of its traffic.

The purchase of a railroad by the government consumes considerable time. To begin with a special commission is appointed, whose maintenance calls for a large expenditure of money. The time consumed by this commission in going through the various investigations and formalities connected with the purchase of a railroad is fairly well exemplified by the case of the Asow line, in which the proceedings have thus far extended over five months, and have not yet reached an end. In the passing from private to government control of a railroad there is, moreover, generally a complete change of personnel. In the case of the Asow line all employés of Jewish faith were discharged, many of them having been with the company for a long term of years. Retention in service in these cases can be secured only by joining the Greek Church.

LOCOMOTIVE BUILDING.

Two heavy freight engines of the class R pattern were completed at the Columbus shops of the Pennsylvania last week, for use on the Pittsburgh division. Three others are nearly completed at the same shops.

The Chicago Belt Line has placed orders with the Schenectady Locomotive Works for seven 6-wheel 18×24 switching engines.

An order for 12 locomotives has been placed by the Great Northern road, with the Brooks Locomotive Works.

The Southern Pacific recently put in service four new ten-wheel locomotives built at the Schenectady works in New York. The driving wheels are 5 ft. 3 in. in diameter, with cylinders 18 × 24 in. The engines with tenders weigh 150,000 lbs., and will be used for both freight and passenger service.

The Purchasing Agent of the Cincinnati, New Orleans & Texas Pacific offers for sale 11 second-hand locomotives which are now in service, but being too light for present traffic are to be replaced by heavy mogul engines. All the engines have four drivers each, the diameters of the wheels varying from 60 to 68 in. The cylinders are all 16 × 24-in. and 17 × 24-in. The total weight of five of the engines is 70,000 lbs. each, and five others weigh 67,000 lbs. each.

The first locomotive built at the shops of the Elmira, Cortland & Northern was completed at Elmira, N. Y., this week.

The Jacksonville Southeastern received last week from the Brooks Locomotive Works four freight engines weighing 60 tons each.

The New York Locomotive Works, of Rome, N. Y., delivered last week to the San Antonio & Aransas Pass road four heavy passenger engines to complete an order.

The Pittsburgh Locomotive Works completed last week the sixth engine of an order for 10 for the Lake Erie & Western.

The Georgia road has recently ordered six passenger engines and two mogul locomotives. Two of the passenger engines were received last week from the Baldwin Locomotive Works. They have 17 × 24-in. cylinders and driving wheels 5½ ft. in diameter.

CAR BUILDING.

The Delaware, Lackawanna & Western is building 100 30-ton box cars to be equipped with the Gould couplers, at its shops at Dover, N. J. Also 50 milk cars with end doors. About 450 men are now employed in the shops. Orders have been recently received to equip 250 passenger cars with the Gold arrangement of the Smith Baker steam heater, for continous steam heating. The shops are building on an average five new passenger cars a month. The company is about to erect a fire-proof paint shop with a capacity for 50 passenger cars. When it is completed the present shop will be used for the repair of cabooses and freight cars.

The St. Charles Car Co., of St. Charles, Mo., has just completed two chair cars for the Jacksonville Southeastern road, which the company regards as as handsome as any cars ever built at its works. They are finished in mahogany, and have elegant toilet-rooms and all conveniences used on passenger cars. They have the latest Scarritt chair, covered with frieze figured plush, and the carpets and other interior finishings are in perfect color harmony. The company is also building six very handsome passenger cars for the Wabash road. They are to be 64 ft. long, on six-wheeled trucks, and have toilet and smoking rooms. The interior of the cars will be finished in mahogany. One complete train has been delivered to the St. Louis & Hannibal, consisting of one baggage and one smoking car, and two very handsome chair cars. A second train of cars like the first one is now being built. The company is about completing the following orders for freight cars: 250 box for the Wabash; 500 coal for the Choctaw Coal & Railway Co.; 250 box for the Mexican National; 100 box for the Iowa Central, and 100 for the St. Louis & Hannibal.

The Central Vermont has just added to its rolling stock four new passenger coaches and a combination baggage and express car built by the Wason Mfg. Co., of Springfield, Mass.

Two baggage cars are being built in the Pittsburgh & Western's shops in Allegheny, Pa.

Contracts have been let to the following firms for 1,000 box cars for the Southwest system of the Pennsylvania lines: Missouri Car & Foundry Co., St. Louis, 150 cars; Peninsular Car Co., Detroit, 150; Erie Car Co., 300; Ohio Falls Car Co., Louisville, 200; Terre Haute Car Co., 200.

The American Car Co. has been incorporated at St. Paul, Minn., with a capital stock of $100,000, one-half paid in. W. Rutton and Emil Alexander, Louis H. Tontrud and T. Papin, Jr., are the incorporators.

The Southern Pacific has recently placed in service on its Atlantic system 100 special furniture cars and 50 ventilated fruit cars.

The Georgia road has just received six new passenger cars and two baggage and mail cars. The shops of the road are now building a number of box and gondola cars to be equipped with air brakes and Thurmond couplers.

BRIDGE BUILDING.

Birmingham, Ala.—The City Council has been asked to build a small bridge across Nineteenth street, to be used chiefly for pedestrian traffic.

Chicago, Ill.—The plan for the viaduct on Halstead street from the south branch of the Chicago River to Archer avenue, which is to be built by the Chicago, Madison & Northern and the Chicago & Alton, will probably be finally approved by the city in a few weeks. The plans and specifications submitted by the railroad engineers provide a clearance of 21 ft. over the tracks. The City Engineer objects to a clearance greater than 17 ft., and as soon as this point is settled proposals for building the bridge will be asked.

Erie, Pa.—The Lake Shore & Michigan Southern will, it is reported, build two or three iron bridges in Erie as soon as the plans for the elevation of the tracks and other improvements have been completed.

Freeport, Pa.—The sub-committee appointed by the Commissioners of Armstrong and Westmoreland counties to decide upon the location of a proposed bridge at Freeport, have settled upon a site. Bids for the bridge will probably be asked for at the next meeting of the Commissioners.

Kalamazoo, Mich.—It is proposed to build a viaduct over the Michigan Central R. R. tracks at this place. The structure would be about 600 ft. long and 30 ft. wide.

Leadvale, Tenn.—It is understood that the East Tennessee, Virginia & Georgia has decided to build an iron bridge over the French Broad River near Leadvale, to replace the long wooden bridge recently burned.

McKinstry's Mill, Md.—The Commissioners of Carrol County have decided to build jointly with Frederick County a 64-ft. bridge at McKinstry's Mills. A bridge is now being built at the same place with a 40 ft. span and a roadway 4 ft. wide.

Millington, N. J.—The Freeholders of Morris and Somerset Counties, N. J., have made an appropriation to build an iron bridge with a 60-ft. span and an 18-ft. driveway, across the Passaic River at Millington.

Red Wing, Minn.—The Superior & Red Wing Bridge Co. has been incorporated by F. W. Hoyt, of Red Wing, Nels P. Haugen, of River Falls, Wis., Hiram Robbins, of New York, and James Barden and F. A. Flower, of West Superior, Wis. The capital stock is $500,000, and the headquarters will be at West Superior. The incorporators are composed largely of the stockholders of the Duluth, Red Wing & Southern Railroad. The company proposes to build a railroad bridge across the Mississippi River at Red Wing.

Riverton, Va.—The Richmond & Danville will, it is reported, build an iron bridge at Riverton, on the Virginia Midland division, to replace the present structure.

Saginaw, Mich.—The Bridge Committee in its report to the City Council recommends the construction of bridges across the Saginaw River at Court street, Center street, Sixth street and Genesee avenue, the structures to cost about $72,400, $51,000, $47,000 and $24,000 respectively.

St. Paul, Minn.—A resolution is before the City Council to compel the Great Northern and the St. Paul & Pacific to build the viaduct over the Trout Brook Valley on Grove street and to Burr street without expense to the city or the property owners. The railroad companies will contest the order if it becomes a law on the ground that the street was not established before their right of way was purchased.

Tajiguas, Cal.—The Board of Supervisors of Santa Barbara County, California, will receive plans, specifications, strain sheets, and bids for a bridge at Tajiguas, until Sept. 28.

Texarkana, Tex.—The drawbridge of the Texarkana & Fort Smith Railroad across the Red River north of Texarkana was finished Aug. 3. It is of iron and steel, and is 950 ft. long and has cost $100,000. It was begun over two years ago, and more than once large portions of the work have been destroyed by the floods and storms.

Topeka, Kan.—The County Commissioners opened the bids for the construction of the Quincy street bridge at Topeka, Aug. 4, but adjourned to Aug. 14 without letting the contract. There were but two bidders. S. Dolman offered a bid of $64,970, and A. J. Tullock, of the Missouri Valley Bridge Co., bid $79,000. The amount of the bonds voted for the bridge is $65,000.

Vernon, Tex.—Field surveys have just been completed by the Union Pacific, Denver & Gulf for the proposed iron and steel bridge across the Pease River, on the Fort Worth & Denver City line, near Vernon. The new bridge will have five or six spans, with a long approach on each side. The location will be below the present crossing of the river. The present bridge has 2,000 ft. of trestle work.

Washington, D. C.—The Commissioners of the District of Columbia have asked for proposals for the construction of the iron highway bridge across the eastern branch of the Potomac River at Bennings, D. C. The bridge is to cost $60,000, and has been previously described. Proposals will be received by the Commissioners until Aug. 22.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In New York the Supreme Court holds that where the charter of a railroad company (Acts N. Y. 1874, c. 585) provides that, upon failure to commence or complete the road as therein provided, the company "is to forfeit the rights acquired by it under this act," a cause of forfeiture does not *per se* divest the company of the franchise without suit brought for that purpose, and the company cannot be attacked for its default in condemnation proceedings instituted by it: affirming 11 N. Y. S. 161.[1]

In New Jersey it is held by the Supreme Court that the legislature has no power to forbid a railroad from cutting through its roadbed which protects adjoining owners from the tide.[2]

In Missouri it is held by the Supreme Court that the statutary provision for an attorney's fee as costs in favor of the plaintiff in suits for injury to stock resulting from the failure of a railroad company to fence its track is a valid exercise of the police power, and is not in conflict with section of the constitution prohibiting special laws granting exclusive privileges.[3]

By the act of Congress authorizing the construction of a railroad bridge across the Arkansas River at Fort Smith, Ark., it is provided that no higher charge shall be made for the transportation of passengers over the bridge than is paid for similar transportation over the railroad leading to the bridge. A state law of 1887 provides that only three cents per mile shall be charged for carrying passengers. The Supreme Court of Arkansas rules that a charge of 70 cents for 11 miles of travel—30 cents for transportation 10 miles, and 40 cents for bridge toll—constituted an overcharge within the meaning of the act.[4]

The Supreme Court of the United States holds that the Ohio statute which authorizes a certain township to construct a few miles of railroad within its limits, intended to ultimately form part of a continuous line of road to be operated and equipped by private capital, violates art. 8, sec. 6, of the Constitution, which

prohibits the general assembly from authorizing any county, city, town or township to become a stockholder in any private corporation, or to raise money for or loan its credit to or in aid of such cor. oration.[5]

In Kentucky the Court of Appeals decides that the statute providing that, before issuing the bonds of any county in aid of any railroad, the county judge shall require of the company a covenant that the bonds shall be honestly applied to the object for which they were subscribed, the lessee of a road in aid of which bonds have been issued may operate it without giving the covenant required, and it does not by so doing become liable to indictments under the act of April 12, 1873, imposing a penalty on any corporation which shall exercise any corporate powers, franchises or privileges without first giving the bonds required by the laws under which it claims such powers, franchises or privileges.[6]

In Texas the Supreme Court decides that under the state constitution, which gives every railroad company the right to intersect any other railroad, and which makes it the duty of each to receive the other's passengers and freight subject to "such regulations as shall be prescribed by law," the legislature has the power to make regulations to secure facilities in transfer from one road to another intersecting road, as well as to secure a shelter for passengers while waiting transit from one road to the other; and hence this section is not violated by a state statute which makes it the duty of a railroad company to maintain a depot at its intersection with another railroad, excepting at intersections adjacent to towns where union depots are established.[7]

In Texas it is held by the Supreme Court that the receiver of a railroad is not liable in damages for removing a switch, which the company had agreed to maintain, where he has not adopted the company's contract as his own, for he is the officer of the court for the management and preservation of the property, and his appointment and acts in that behalf do not absolve the company from liability for consequent breaches of its contracts.[8]

In the same state it is held that where several million dollars of the net earnings of a railroad, while in the hands of a receiver, have been invested in betterments and improvements, and the receiver has been discharged, and the property restored to the company, it is liable on a cause of action which accrued against the receiver for the destruction of a street car by a train.[9]

In Texas the Supreme Court rules that the city of Dallas may impose a license tax on ticket brokers, though that occupation has not been taxed by the state, under section 10 of the city's charter, giving it power to license, tax and regulate certain occupations, and "all other trades, professions, occupations and callings, the taxing of which is not prohibited by the constitution;" and the section of the constitution providing that the occupation tax levied by any city shall not exceed one-half of the tax levied by the state on the same profession or business does not limit the tax to occupations taxed by the state. But an ordinance having imposed a license tax of $500 a year, and two ticket brokers having testified in a prosecution for its violation that such a tax was prohibitory, and this evidence being uncontradicted a conviction cannot be sustained.[10]

In North Carolina the Supreme Court rules that the statute providing that no railroad company shall be barred of or presumed to have conveyed any real estate, right of way, etc., by any statute of limitations, or by occupation of the same by any person, the title of a company to its right of way cannot be lost by occupancy as to any part of it by lapse of time.[11]

In Nebraska the Supreme Court rules that where bonds are issued by a county to aid in the construction of a railroad the taxable property in territory added to the county after the voting of said bonds is liable to taxation for their payment.[12]

Injuries to Passengers, Employes and Strangers.

In Michigan the Supreme Court decides that, notwithstanding the state statute requiring all railroads to fill or block the frogs, switches and guard rails, there can be no recovery for the death of a brakeman who, while voluntary attempting to uncouple moving cars, gets his foot caught in an unblocked "split switch," when it appears that he had been several years in the employ of the company, was familiar with the switches and track where the accident occurred, had been warned by the written rules of the company, which he had read, not to enter between the cars in motion to couple or uncouple them, and had signed an acknowledgment when he became brakeman that he knew the duties were dangerous, and that he had read the rules by which he would be governed.[13]

In Massachusetts the plaintiff, while running along the pier in the performance of his duty as superintendent of defendant's drawbridge, was injured by breaking through a board which was fair on top, but had rotted away underneath. He had occupied the position for three or four years and was well aware of the general defe tive condition of the pier. A few days before he called the proper officer's attention to it, saying that somebody would get hurt unless it was repaired, but did not complain on his own account or offer to leave. He was told that it would soon be fixed. It is held by the Supreme Judicial Court that he assumed the risks of his employment and was not excused because of the promise to repair.[14]

In Kansas it is laid down by the Supreme Court that where an exposure is made for the purpose of saving human life, and the person making the exposure is injured thereby, it is for the jury to say whether the conduct of the party injured is to be deemed rash or reckless. Exposure of life by an employé to save life is neither wrongful nor negligent, if attempted within the scope of an employé's duty, unless made under circumstances constituting rashness in the judgment of prudent persons.[15]

In Michigan the Supreme Court holds that the failure of a foreman, of a gang of sectionmen who are propelling a hand car along the track, to send a lookout ahead near a curve to give warning of a train, of whose approach all are chargeable with knowledge, if negligence is participated in by the sectionmen, who voluntarily, and without express orders from the foreman, remain on the car; and there can be no recovery for the death of one of them resulting from a collision between the train and the hand car.[16]

In Iowa the Supreme Court rules that, where there is evidence that a brakeman could easily and more safely have effected an uncoupling before the engine started or after it stopped, the jury should be specifically instructed that they should consider this fact in connection with the condition of the track, the absence of run boards, and all the other circumstances throwing light on the question, in determining whether or not the brakeman was guilty of contributory negligence.[17]

In Massachusetts a man was killed by a train running 35 or 40 miles an hour while he was standing between the tracks facing the train. When the engineer first saw him, at a distance of less than 300 ft., he began to blow short whistles, but did not at once put on the brakes. There was a plank walk crossing the track at the place, leading to a private building, but it was not a highway, townway or traveled place. The Supreme Court held that the company was not guilty of negligence.[18]

In the Federal Court it is ruled that 40 or 45 miles an hour is not an excessive speed at which to approach a railroad crossing in the country, where the train which is running at that speed has a whistle and a bell which can be heard at the distance of a mile.[19]

In New Hampshire the Supreme Court rules that the fact that a person killed at a crossing by a special train, running near the time of a regular train, was afraid of the crossing, and usually waited at home until trains had passed; that she had her watch with her, had a safe horse, and stopped at the foot of the ascent to the track; that the view was somewhat obstructed; and that the signal was not given as required by the statute—were facts sufficient to warrant a finding that she was not negligent.[20]

[1] *In re* Brooklyn El. R. Co (N. Y.), 23 N. E. 474.
[2] Koch v. D., L. & W. R. Co., 21 Atl. Rep. 284.
[3] Perkins v. St. L., I. M. & S. Ry. Co., 15 S. W. Rep. 320.
[4] St. L. & S. F. R. C. v. Stevenson, 15 S. W. Rep. 22.
[5] Pleasant Tp. v. Ætna Life Ins. Co., 11 S. Ct. Rep. 215.
[6] Commonwealth v. C. & O. Ry. Co., 15 S. W. Rep. 53.
[7] S. A. & A. P. Ry. Co. v. State, 14 S. W. Rep. 1,063.
[8] Brown v. Warner, 14 S. W. Rep. 1,032.
[9] Brown v. Rosedale St. Ry. Co., 15 S. W. Rep. 120.
[10] Hirshfield v. City of Dallas, 15 S. W. Rep. 124.
[11] Purifoy v. R. & D. R. Co., 12 S. E. Rep. 741.
[12] C., St. P., M. & O. R. Co. v. Cuming Co., 47 N.W. Rep. 1,121.
[13] Grand v. R. Co., 47 N. W. Rep., 837.
[14] Lewis v. N. Y. & N. E. R. Co. (Mass.), 26 N. E., Rep. 431.
[15] Condiff v. K. C., Ft. S. & G. R. Co., 25 Pac. Rep. 562.
[16] Hammond v. C. & G. T. Ry. Co., 47 N. W. Rep. 965.
[17] Picart v. C., R. I. & P. Ry. Co., 47 N. W. Rep. 1,017.
[18] June v. B. & A. R. Co., 26 N. E. Rep. 238.
[19] Griffith v. B. & O. R. Co., 44 Fed. Rep. 574.
[20] Evans v. Concord R. Corp., 21 Atl. Rep. 105.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Boston & Maine, $3 per share on the preferred stock, payable Sept. 1.

Chicago & West Michigan, semi-annual, 1½ per cent., payable Aug. 15.

Cleveland & Pittsburgh, quarterly, 1¾ per cent., payable Sept. 1.

North Pennsylvania, quarterly, 2 per cent., payable Aug. 25.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Boston & Albany, annual, Boston, Mass., Sept. 23.

Boston, Hoosac Tunnel & Western, annual, Saratoga Springs, N. Y., Aug. 19.

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 16.

Chicago, St. Paul & Kansas City, annual, Dubuque, Ia., Sept. 3.

Connecticut River, annual, Springfield, Mass., Sept. 16.

Detroit & St. Clair River, special, St. Clair, Mich., Sept. 15.

Fitchburg, annual, Boston, Mass., Sept. 30.

Hutchinson & Southern, special, Hutchinson, Kan., Aug. 25.

Iowa Central, annual, Chicago, Ill., Sept. 4.

Lake Erie & Western, annual, Bloomington, Ill., Sept. 2.

Marietta & North Georgia, annual, Marietta, Ga., Aug. 20.

Minneapolis, St. Paul & Sault Ste. Marie, annual, Minneapolis, Minn., Sept. 16.

Nashville, Chattanooga & St. Louis, annual, Nashville, Tenn., Sept. 9.

New York, Ontario & Western, annual, 18 Exchange Place, New York City, Sept. 30.

New York, Providence & Boston, annual, Providence, R. I., Sept. 9.

Ohio, Indiana & Western, annual, Indianapolis, Ind., Sept. 8.

Old Colony, annual, Boston, Mass., Sept. 29.

St. Johnsbury & Lake Champlain, annual, St. Johnsbury, Vt., Sept. 10.

Toledo & Ohio Central, annual, Toledo, O., Sept. 7.

Wabash, annual, St. Louis, Mo., Sept. 8.

Westerly & Jewett City, for the purpose of organization, Town Hall., Westerly, R. I., Aug. 18.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Roadmasters' Association* will hold its ninth annual meeting at Boston, Mass., Aug. 19 and 20.

The *International Association of Ticket Agents* will hold its next annual meeting at St. Paul, Minn., Sept. 7.

The *Roadmasters' Association of America* will hold its next annual convention at the West Hotel, Minneapolis, Minn., Sept. 8, 9 and 10.

The *Master Car and Locomotive Painters' Association* will hold its twenty-second annual convention at the Arlington Hotel, Washington, D. C., Sept. 9, 10 and 11.

The *American Association of General Passenger and Ticket Agents* will hold its next annual convention at Old Point Comfort, Va., Sept. 15.

The *American Association of Railroad Clerks* will hold its second national convention at St. Louis, Mo., beginning Sept. 16.

The *International Brotherhood of Railway Conductors* will hold its third annual convention at Louisville, Ky., Sept. 21.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* will hold its next meeting at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in September.

The *Southern Railway Club* holds regular meetings on the third Thursday of the months of January, February, March, May, September and November at such points as are selected at each meeting.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* hold regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court. Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* hold regular meetings at Wichita on the second Wednesday of each month at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of erch month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at iss rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Association of Civil Engineers of Dallas* meets at 803 Commerce street, Dallas, Tex., on the first Friday of each month at 4 o'clock p. m.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in eacu month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N.Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis. Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

Brotherhood of Railway Car Men.

The second annual Convention of the Brotherhood of Railway Car Men of the United States, in session at Pueblo, Colo., closed on Friday last after electing the following officers: Grand Chief Car Man and General Organizer, W. S. Missinar, St. Joseph, Mo.; Grand Vice-Chief, B. F. White, Temple, Tex.; Grand Secretary and Treasurer, S. Kileker, Minneapolis, Minn.; Executive Board, W. H. Ronemis, Cedar Rapids, Ia.; W. A. Brown, St. Louis; John Caples, Kansas City; W. D. O'Donnell, Minneapolis.

Railway Freight Claim Association.

The Railway Freight Claim Association of the Eastern, Southern and Western States closed its semi-annual meeting at Boston, Aug. 7. It was decided to hold the next meeting in Chicago in November.

The Brotherhood of Railway Trackmen.

The fifth annual meeting of the Order of Railway Trackmen of the United States was in session at Birmingham, Ala., last week. They elected John D. Wilson, of Alabama, President, and D. A. Russell, Secretary. A motion was passed to consolidate the order with the North American Section Foremen, the Northern organization, and a committee was appointed to attend the annual convention of that order in St. Louis in October to bring the matter up.

PERSONAL.

—Mr. M. A. Zook has resigned as Superintendent of the first division of the Louisville, New Albany & Chicago.

—Mr. S. D. Bradley, Master Mechanic of the Grand Rapids & Indiana road, died at his home in Grand Rapids, Mich., July 23, from paralysis of the brain.

—Mr. W. B. W. Howe, Jr., Chief Enginee rof the Savannah, Florida & Western and the roads of the Plant Sys-

tem, has resigned, as a result of a change in the organization of the engineering department.

—Mr. William B. Russell, until last month General Western Freight Agent of the Richmond & Danville road at St. Louis, Mo., died in that city Aug. 3, aged 64 years. He was formerly connected with the Vicksburg & Meridian road for many years.

—Mr. John M. Culp, General Freight Agent of the Louisville & Nashville, has resigned to become Assistant Traffic Manager of the Richmond & Danville line on Sept. 1. He will be located at Atlanta, Ga. Mr. Culp has been with the Louisville & Nashville road for 22 years.

—Mr. Frederick H. Robinson, Assistant Engineer of Maintenance of Way on the Philadelphia, Wilmington & Baltimore road, has been elected Professor of Civil Engineering of Delaware College, Newark, Del., and Chief of the Engineering Department, just established.

—Mr. William H. Truesdale, Receiver and General Manager of the Minneapolis & St. Louis, has been prevailed upon to withdraw his resignation, which was written last June, and to remain with the road for some time longer, probably until the reorganization has been concluded.

—Mr. John D. Kilpatrick, senior member of the contracting firm of Kilpatrick Brothers & Collins, died at his home at Beatrice, Neb., July 27. The firm of which he was a member has built some of the longest of the Western railroads, including the Central Pacific and a large part of the Union Pacific.

—Mr. Sanford Keeler, Superintendent of the Flint & Pere Marquette road has resigned and has been succeeded by Mr. W. A. Potter, Assistant Superintendent. Mr. Keeler has been connected with this road for over 30 years, beginning as a locomotive fireman in 1860. He has been Superintendent since 1875.

—Mr. Peter McQueen Gibson, who recently resigned as Master Mechanic of the New York Central & Hudson River at New York after 21 years' service on that line, was presented last week by the locomotive engineers and firemen with a silver service valued at $1,000. Mr. Gibson has resigned to go into private business.

—Mr. David Edwards, who has been Assistant General Manager of the Flint & Pere Marquette road for ten years, has resigned that position. He was General Freight Agent of the same road from Sept., 1874, to May, 1881, and was before that for two years superintendent of the Canada Southern road west of the Detroit river.

—Mr. N. O. Whitney, who has been Assistant to the Chief Engineer of the Pennsylvania Company, at Chicago, for several years, has resigned to become head of the Department of Railroad Engineering of the University of Wisconsin, at Madison. Mr. Whitney was principal Assistant Engineer of the Mexican National for some time, and was afterward Resident Engineer of the South Pennsylvania Railroad for two years.

—Mr. Joseph Crawford, Superintendent of the New York Division of the Pennsylvania Railroad, was well enough to be removed from Jersey City to Richfield Springs last week. Mr. Crawford was injured in May by a timber which fell from the roof of the new train shed in Jersey City. His left leg was fractured below the knee and it is only recently that the surgeons have been able to state positively that amputation would not be necessary.

—Mr. James R. Ogden, President of the Knoxville Iron Co. and the Knoxville Car Wheel Works, died in Knoxville, Tenn., Aug. 1, aged 54 years. He had been suffering for several months with a dropsical affection. Mr. Ogden was for many years a prominent railroad officer, being General Freight Agent of the East Tennessee, Virginia & Georgia from 1870 to February, 1886. He had previously been General Freight and Passenger Agent for five years. He became President of the Knoxville Car Wheel Works in September, 1887, but had been Vice-Commissioner of the Southern Railway & Steamship Co. earlier in the year.

—Mr. T. J. Nicholl, recently Superintendent of Construction of the Louisville, New Orleans & Texas, is now practicing as consulting engineer and engineer of bridges. His residence is 206 Cass street, Chicago. Mr. Nicholl has had a very extensive experience in the engineering department of Western and Southern railroads. He has been in railroad service continually since 1868, when he was rodman of an engineer corps on the Chicago, Burlington & Quincy. He has been Superintendent of Construction of the Dakota Central and other Dakota lines of the Chicago & Northwestern, and was appointed General Manager of the East and West of Alabama road in 1885. Two years later he became General Manager of the Natchez, Jackson & Columbus.

—The resignation of Mr. Louis Eckstein as General Passenger and Ticket Agent of the Wisconsin Central, which was noted last week, will probably take effect Sept. 1. Mr. Eckstein has become a partner in a new firm which expects to open a large jobbing house in Chicago early in the fall. He is now about 27 years old and has been in railroad service about 11 years, his first position being as a clerk in the passenger department of the Wisconsin Central at Milwaukee. When Mr. James Barker, General Passenger and Ticket Agent of the Wisconsin Central, resigned three years ago, Mr. Eckstein was placed in charge of the department. He was appointed General Passenger and Ticket Agent a year and a half ago. He is also President of the Chicago Railroad Association and is a very popular railroad officer. Mr. Eckstein will probably be succeeded by Mr. J. C. Pond, at present Assistant General Passenger Agent of the Northern Pacific. Mr. Pond is now about 35 years old and has been connected with the passenger department of the Northern Pacific for about 10 years.

ELECTIONS AND APPOINTMENTS.

Balimore & Ohio.—Robert B. Campbell has been appointed General Superintendent of the Trans-Ohio divisions, with headquarters at Chicago, to fill the vacancy occasioned by the resignation of Edward Dickinson.

Cape May & Sewell's Point.—J. Henry Edmunds, of Cape May City, has been appointed Manager of this line for W. S. Boody, the lessee.

Chicago, Milwaukee & St. Paul.—The following appointments and changes have been announced: F. S. Atkin, appointed Superintendent of terminals at Chicago; T. H. Dancy, appointed Superintendent of terminals at Milwaukee; Superintendent W. W. Collins, transferred from the Northern to the Prairie Du Chien and Mineral Point divisions and J. F. Gibson, appointed Superintendent of the Northern division.

Chippewa River & Menomonee.—The officers of this company are as follows: F. Weyerhaeuser, President; O. H. Ingram, Vice-President; D. R. Moon, General Manager; W. A. Rust, Treasurer; Wm. Irvine, Secretary; N. Mills, Superintendent. The general offices are at Chippewa Falls, Wis.

Choctaw Coal & Railway Co.—J. D. Bradford has been appointed Acting Manager for the Receivers, with headquarters at South McAlester, Indian Territory.

Cleveland & Mahoning Valley.—At the annual meeting in Cleveland, O., Aug. 4, the following directors were elected for three years: John Todd, J. E. Ingersoll and Price McKinney. F. F. Hickox was elected to fill the unexpired term of E. B. Hale, deceased. The directors elected officers as follows: President, Stevenson Burke; Treasurer, E. R. Perkins; Secretary, E. E. Poppleton.

Dalton, Spring Place & Eastern.—Paul B. Tranmell, H. C. Hamilton, D. Buckofzer, F. T. Reynolds, of Dalton, Ga., and C. C. Davis, of Chattanooga, Tenn., have applied to the Georgia Legislature for a charter for this company.

Denver & Rio Grande.—Stephen Little, formerly Controller of the New York, Lake Erie & Western, and subsequently occupying a similar place with Pullman's Palace Car Co. until recently, has been elected Controller of this company, with headquarters in New York City.

Flint & Pere Marquette.—The following changes have been made in the organization of the operating department: The office of Assistant General Manager has been abolished; A. Patriarche has been appointed Traffic Manager, in charge of all freight and passenger business; Sanford Keeler having resigned the position of superintendent, W. F. Potter has been appointed General Superintendent, in charge of all train and station service; E. M. Wratten has been appointed Superintendent of Water Lines, with headquarters at Ludington, Mich., with full charge of all steamers and boat terminals; T. J. Hatswell has been appointed Master Mechanic, in charge of motive power, machinery and cars; George M. Brown has been appointed Superintendent of Roadway and Structures, in charge of maintenance of way, bridges and buildings. C. S. Cheney, late Chief Train Dispatcher and Superintendent of Telegraph has been appointed Train Master of the system; A. H. Follett becomes Chief Train Despatcher; L. T. Chubbuck is assigned to duty as Division Superintendent, with headquarters at Port Huron, Mich.; S. T. Crapo, who has been Division Superintendent at Port Huron, will act as confidential clerk and assistant to General Manager Baldwin.

Grand Trunk.—W. T. Rollo, at present Secretary to General Superintendent James Stevenson, has been appointed Division Superintendent with office at Richmond, Que., to succeed J. Trenaman, resigned.

Lake Jessup, Indian River & Atlantic.—C. M. Lewis, Rookery Building, Chicago; John Dickinson and others, of Chicago, Ill.; C. H. Hamilton, of Dubuque, Ia.; J. E. Brown, of Chuluota, Fla., and others are the incorporators of this Florida company. The principal office is at Chuluota, Fla.

Laurel & Roaring Point.—The stockholders of the projected Maryland road have elected these officers: President, A. J. Horsey; Vice-President, W. T. Records; Treasurer, T. C. Horsey; Secretary, A. F. Jones; Directors: W. F. Causey, A. J. Horsey, T. C. Horsey, F. Turner, W. F. Records, G. D. Insley and George Bounds.

Louisville, New Albany & Chicago.—M. A. Zook has resigned as Superintendent of the first division and J. B. Safford, Superintendent of the second division, has been appointed Superintendent of Transportation, it is said, in place of O. B. Grant who will become Chief Clerk to General Superintendent Collins. H. Craig has been appointed Purchasing Agent, in place of W. H. Folsom, resigned. T. J. McGuire has been appointed Assistant General Superintendent, with headquarters at Monon, Ind.

Mexican National.—Louis H. Sherman has been promoted to the position of Master Mechanic of the Southern Division, with office at San Luis Potosi, Mex., vice R. H. Johnson, resigned. I. M. Hutchison has been appointed Road Foreman of Engines of the Southern Division, and will report to the Superintendent Motive Power and Machinery.

Middle Georgia & Atlantic.—The Seaboard Company, of Savannah, Ga., as owners, on Aug. 3, assumed the control and operation of this road, now open for traffic between Eatonton and Machen, Ga. J. A. Droege has been appointed Superintendent, with office at Eatonton, Ga., in charge of the operation of the road.

New Orleans & Southern.—The following directors have been elected by this company, the reorganized New Orleans & Gulf: B. S. Story, H. P. Kernochan, Alfred Le Blanc, Lloyd R. Coleman, J. A Larnerd and H. S. Bell, of New Orleans, and Joseph Price, Henry Pierson and Charles J. Russel, of London. The board elected J. A. Larnred, President and General Manager; Lloyd R. Coleman, Vice President and H. S. Bell, Secretary and Treasurer.

Pemberton Smith, formerly Assistant Supervisor of the Pennsylvania, has been appointed Assistant Train Master of the Western Division of this road, with office at Rochester, N. Y.

New York Central & Hudson River.—W. W. Thompson, of the Manhattan (Elevated) road, has been appointed Master Mechanic with office at New York City, to succeed Peter McQ. Gibson, resigned.

New York, Lake Erie & Western.—T. A. Lawes has been appointed Master Mechanic of the Eastern division, with headquarters at Jersey City, N. J.

Northern Pacific.—A. L. Craig has been appointed Assistant General Ticket Agent to succeed James C. Pond, who goes to Chicago to assume his duties as General Passenger Agent of the Wisconsin Central.

Richmond & Danville.—The jurisdiction of J. A. Dodson, Superintendent of the South Carolina, Columbia & Greenville divisions, has been extended over the Spartanburg, Union & Columbia road, relieving R. R. Bridges, the Superintendent of the Western North Carolina Division.

St. Louis, Alton & Terre Haute.—J. W. Stokes, General Foreman of Rolling Stock on the Springfield Division of the Ohio & Mississippi, has resigned to accept a similar position on this line in charge of rolling stock.

St. Louis, Cape Girardeau & Fort Smith.—Eugene S. McCarthy has been appointed General Manager, with office at Cape Girardeau, Mo. The office is a newly created one, the duties of the position having been previously included in the office of President.

San Antonio & Aransas Pass.—D. B. Robinson is now General Manager. George L. Sands has been appointed Superintendent of Transportation, with headquarters at Yoakum, Tex., instead of General Master of Transportation as reported last week. He succeeds F. A. Lister, resigned.

Savannah & Oconee.—D. C. Bacon, H. C. Smart and M. F. Amorous are the incorporators of this company, who have applied to the Georgia Legislature for a charter for this line and also for the Savannah & Duvall.

Snake River, National Park & Pacific.—The incorporators are J. C. Anderson, C. C. Tautphaus, S. F. Taylor, J. E. Smith, B. McCaffrey, C. H. Blickensderfer, H. W. Gaumer, Geo. A. Robethan, S. C. Winters, Alex. West, C. R. Shaw, A. D. Morrison, A. V. Scott, B. A. Jenne, C. R. Dwight, C. W. Ramsey, E. P. Henry, F. A. Williams, John M. Taylor. The following are the officers of the company: J. C. Anderson, President; B. McCaffrey, Vice-President; A. V. Scott, Secretary and Treasurer, all of Idaho Falls, Idaho.

Toledo, St. Louis & Kansas City.—The office of paymaster has been abolished and M. L. Crowell, who has filled that position, has been appointed Claim Agent, with headquarters at Toledo, O.

Utah & Wyoming.—The incorporators of this Utah company are as follows: B. G. Raybould, William S. Martin, Alfred Thompson, Oscar Vandercook, Emory Ward, Samuel F. Walker, O. J. Creer, Theodore Brough, John B. Taylor, George O. Cheney and Henry Denhalter, all of Salt Lake City, Utah.

RAILROAD CONSTRUCTION.
Incorporations, Surveys Etc.

Akron & Chicago Junction.—After many unexpected delays passenger trains began running on the new line of the Baltimore & Ohio to Chicago, on Aug. 9, nearly a month after the time expected. The line has been fully described during the progre s of construction, but it may be well to repeat some of the facts. The new road is 73 miles long, and extends from Akron, on the Valley road, to Chicago Junction, O. The first 16 miles from Akron southwesterly to Warwick is practically double track through a contract with the Cleveland, Akron & Columbus. The tracks of that road and of the new road are parallel. From Warwick the new line extends northwesterly, and then due west to Chicago Junction, where it connects the old line of the Baltimore & Ohio running due north from Newark, O. From the Junction the Baltimore & Ohio has a direct line to Chicago. By this new line the distance by the Baltimore & Ohio between Pittsburgh and Chicago is 478 miles, which is 62 miles shorter than the old line from Pittsburgh to Chicago by way of Wheeling, W. Va. The new route from Pittsburgh is over the Pittsburgh & Western to Akron, and thence to Chicago Junction over the new road. The road, in addition to cutting off the wide detour necessitated by the old line, will have less mountain grades. The road has been built in a most substantial manner, and is laid with heavy rails on oak ties with gravel ballast. Stations have been completed or are being erected at all the principal points on the line. Work was commenced on the new line Aug. 1, 1890, by the contractors, Ryan & McDonald. The road was finished by July 1, and freight trains have been running over it for several weeks.

Atlantic & Gulf.—A. F. Tilden, of New York City; James Shears, of Charlotte, N. C.; J. L. Davis, of Lake Providence, La.; H. B. R. Tilden, of Danbury, N. C., and Joseph Walton, of London, Eng., are interested in this company recently incorporated in Florida with a capital stock of $2,000,000. It is proposed to build a road through the counties of St. Johns, Clay, Bradford, Aluacha and La Fayette.

Baltimore & Ohio.—When the company secured control of the Confluence & Oakland line in 1889, it had only been completed from Confluence Junction to Manor, Md., in Garrett County, in the western part of the state. The line was built by a syndicate owning lands in Garrett County, and it was to have been extended south to Oakland, to a second connection with the Baltimore & Ohio. For the last year repeated if not influential efforts have been made to induce the company to carry out the original plans. A recent report states that J. J. Whetstone, of Buffalo, N. Y., has just revised the old surveys, and that it is probable that the line will be soon completed to Oakland.

Degor & Co., of Cleveland, are the contractors for the construction of the extension of the Metropolitan Southern Division, between Connecticut avenue extended and Linden Station, Washington, D. C. The work is to be completed early in September.

Beech Creek.—George S. Good & Co., of Lock Haven, Pa., have a contract for building 16 miles of the Clearfield extension of this line south from Keer Moor, Clearfield County, toward Patton, Cambria County, Pa. The work is very heavy, and the section now under contract will include the construction of two tunnels. The contractors will let part of the work on application at their office at Keer Moor.

Burlington & Missouri River.—The citizens of Kearney, Neb., on the north bank of the Platte River, believe that this company can be induced to build a line about 20 miles long from Kearney southwest to Holdredge. Kearney wants to be on the Burlington's main line, and is confident that the construction of this line will accomplish that purpose happily. The main line of the road from Lincoln now passes to the south of Kearney through Holdredge, and Kearney is connected with the system by a branch extending northwesterly from the main line at Kenesaw, Neb.

A recent dispatch from Cheyenne, Wyo., states that the company has decided to extend the Newcastle line to both Buffalo and Sheridan, Wyo., instead of building the main line to one or the other of the towns. A new junction town is to be established, at which the two branches will converge. The company is not likely to do any further work extending its Wyoming lines this year, and the dispatch is probably not authoritative. It is interesting, nevertheless. Buffalo and Sheridan are new towns in Northwestern Wyoming are the capitals of agricultural counties, and both are growing in the centre of mining, farming and stock-raising districts.

About 20 miles of track has, it is reported, been laid beyond Belle Fourche Maline, on this line, in Southeastern Wyoming near the Black Hills in Dakota, and that 10 miles more to Donkey Creek would be laid this month. The roadbed is graded and ready for the iron about 50 miles beyond Donkey Creek, to a point about 50

miles east of Buffalo and about 100 miles southeast of Sheridan. The proposed junction is to be at the present end of grade.

Carolina Midland.—The town of Batesburg, S. C., which is to be the terminus of the proposed branch from Seivern, voted last week to subscribe $10,000 in township bonds for the extension. Right of way has been about secured for the 15 miles which it is proposed to construct, and it is stated that the action of Batesburg assures the building of the line.

Central of New Jersey.—The most important of the improvements now proposed on the line in Northern New Jersey are the changes at Elizabeth, the expense of which will approximate $500,000. The work will consist of the elevation of the track and a depression of the streets, thus eliminating the grade crossings. The elevation will begin at Magnolia avenue, extending westwardly for a distance of nearly one mile. The greatest height attained will be near Spring street 7 ft. The surface of the ground at crossing points is well adapted to a modification of this character. The bridge over Union street the extreme western limit of the section to be improved, will be completed within a month. Five streets will have overhead crossings. Broad street will also be depressed, but nothing will be done at that point until after certain changes in the roadbed of the Pennsylvania, now in progress, are complete. The company is also to begin soon the construction of a new passenger station at Elizabeth. The plan really contemplates the erection of two stations, of either brick or stone, one on each side of the track. There is now a four-track system in operation from Jersey City to Bound Brook, with the exception of the line across the Newark Bay Bridge. The bridge is being partly renewed by driving creosoted piling. The bridge is 7,600 ft. long with a draw in the middle. At Bergen Point two new heavy six-track iron bridges are being constructed.

Charleston, Clendenin & Sutton.—The special railroad election held in three districts of Charleston County, W. Va., Aug. 1, on the proposition to subscribe $100,000 to the capital stock of the road, resulted in ordering the subscription by an almost unanimous vote. Charleston voted $80,000, Elkhorn and Big Sandy $5,000. This, with $75,000 subscribed by private citizens, will probably insure the construction of the road to Sutton, opening a large territory of rich coal and timber land, and giving the Elk and Kanawha valleys more direct connection with Pittsburgh and cities northeast. The line will extend northeast from Charleston, along Elk River, for about 60 miles, connecting with the West Virginia & Pittsburgh at Sutton. F. W. Abney, of Charleston, is President.

Chicago & Alton.—Work is to begin this week on the second track between Pontiac and Chenoa, Ill., a distance of 12 miles. The work will be commenced at both these points and at Ocoya. The line is at present double tracked from Chicago to Pontiac, 92 miles. and from Towanda to Bloomington. With the completion of the work now about to be begun the entire line between Chicago and Bloomington, 127 miles, will be double track with the exception of the 16 miles between Chenoa and Towanda. The second track will probably be built between these points next year.

Dover & South Bound.—A road is being constructed under the charter of this company through Craven County by the Goldsboro Lumber Company, of Dover, N. C. The line will be standard gauge, but it is to be used principally for logging purposes. The road now being constructed is from Dover, on the Atlantic & North Carolina, southward a distance of about 10 miles, and it will also be built north from Dover, about seven miles.

Duluth & Iron Range.—The change in grade on the line of this road at Mesaba Heights, recently referred to, comprises the following work: the lowering of a summit some 8 ft., reducing the total curvature from 140 to 40 degrees, the maximum curvature from seven to four degrees, and limiting the tangent grade from 1.6 per cent. to 0.9 per cent. There is no bridging or tunneling. The work is not very heavy for a mineral country; the material comprises earth, loose rock and solid rock. The work is only part of the proposed general reduction of limiting gradient, based on a general plan matured several years ago and gradually carried out as rapidly as the increase of business warrants the investment.

Duluth, South Shore & Atlantic.—The branch from Kitchi, on this line, to timber lands in Houghton County, Mich., is not to be built by this company, as reported. The survey was made for S. Frost, of Stanton, Mich., and the line is intended for logging purposes only. If it is built at all it will be by Mr. Frost, who will also equip and operate it.

Flint & Pere Marquette.—The company has recently arranged to build a bridge about eight miles long into a forest said to contain over 100,000,000 ft. of timber. The owners of the timber have made a contract with the company to send all the lumber cut over the branch.

Geneva & Van Ettenville.—The contracts on the last 14 miles on this branch of the Lehigh Valley have been let. Eight miles has been awarded to John Shields, Flemington, N. J., and six miles to Sayre & McDonald, who have other contracts on the line. This work just let is on the southern section of the line, near Van Ettenville and Sayre, where connection is to be made with the main line of the Lehigh Valley. A large amount of the grading north of Van Ettenville is now completed and it is expected to lay a considerable part of the track this year.

Georgia Roads.—Bills have been introduced in the Georgia Legislature chartering the following companies: A company to build a road from Atlanta to Manchester, Ga., of which W. R. Hammond, R. H. Conner, Mr. Harralson, C. W. Smith and others are the incorporators; the Thomson & Lincolnton, C. H. Ellington, T. S. Scott and others, of Thomson, Ga., incorporators, and the Madison & Eatonton; and also to amend the charter of the Albany & Bainbridge. Bills incorporating the following companies have passed the Senate, or have become laws: The Carrollton Southern, the South Atlantic, the Cincinnati, Georgia & Florida; the Atlanta, Americus & Florida; the Dalton, Spring Place & Eastern.

Georgia & Western.—A bill has been introduced in the Georgia Legislature to incorporate this company, with principal office at Augusta. The incorporators are W. E. Gary, C. E. Smith and Colden Rhind. They propose to build a line from Augusta to a point on the Georgia, Carolina & Northern, and to a point on the Tennessee line.

Grayling, Twin Lakes & Northeastern.—The route of this road, which, as reported last week, has been recently chartered in Michigan, is from a point in Crawford County, on the Michigan Central, near Grayling, northwest a distance of about 30 miles to near Twin Lakes, in Montmorency County. The capital stock is $240,000. The following are the incorporators: George L. Alexander, President; Rasmus Hanson, Marius Hanson, David M. Kneeland, N. P. Olson, Nels P. Salling and Nels Michelson, all of Grayling, Mich.

Houston, Central Arkansas & Northern.—Henry Forrest & Co., who have the contract for building the Southern Division of this road, state that all the grading has been completed from Columbia south to Alexandria, La., where connection is made with the Texas & Pacific. The bridge across the Ouachita River south of Columbia is now about half completed, and the contractors expect to lay the track across the bridge in about a month. It will probably take 45 days longer to complete the track to Alexandria, a distance of 60 miles from Columbia.

Jacksonville, Tampa & Key West.—The change of the gauge on the northern part of the Florida Southern division between Bartow on the main line and Fort Meade, Fla., a distance of 12 miles, which was begun in June, has been completed and trains are now running on the new standard gauge track.

Lackawanna & Montrose.—Smith & Henwood, of Montrose, Pa., who are the contractors on the Montrose extension of this Pennsylvania road, have the grading well advanced and expect to complete the road to Montrose early in the fall.

Lehigh Coal & Iron & Railroad Co.—Luther C. Watkins, George H. Drew and Charles W. Boynton, of Boston, Mass., have chartered the company to build a road from Greenville, Tenn., to Middlesborough, Ky. The survey will be commenced in September.

Lehigh Valley.—The Pittstown branch has been opened for regular traffic. Trains have been running since July 2 on the branch, four miles in length, extending in a southwesterly direction from Lansdown Station on the New Jersey division. There are only two towns of importance on the line, Lansdown and Pittstown. The work is light and the road is built as cheaply as possible, following Cacapoolin Creek.

The dispute between the Central of New Jersey and the Lehigh Valley over a grade crossing on the Meadows, between Newark and Elizabeth, N. J., has been brought to an end by a decision of Chancellor McGill, of New Jersey. The Chancellor has ordered that the $36,000 award of damages to the Central of New Jersey be paid to that company direct by the Lehigh Valley, which has been done, and the Central Railroad has removed all the obstructions it had placed upon its tracks to prevent the crossing. The new tracks will be laid in a few days. With the exception of about 100 ft. near the crossing in question, the Lehigh Valley's line between South Plainfield and Communipaw has been completed.

Lenoir & Linville.—About eight miles of this line has been graded from Lenoir, in Caldwell County, on the Richmond & Danville, northwest toward Linville in Mitchell County, N. C. The tracklaying is now in progress and the rails have been laid for about one and one-quarter miles. John N. Houck, of Lenoir, is Superintendent.

Mason County Central.—Allen C. Mason, of Tacoma, Wash., and an Eastern syndicate has purchased the controlling interest of this road from the lumber firm which now owns it and operates it as a logging road. The amount given as the purchase price, $80,000, may be an overstatement, for the completed road involved in the transfer does not exceed seven miles. It is located in Mason County, Wash., beginning at Shelton, on Puget Sound, north of Olympia. It is projected to extend to Grays Harbor, 45 miles west of Shelton, but as several lines are now being built to that vicinity the route may be modified. That an extension will be built is regarded as certain. The first construction work to be undertaken will be a line to connect with the Northern Pacific—probably with its branch to Grays Harbor.

McKeesport & Bessemer.—This branch of the Pennsylvania, which gives it an entrance into McKeesport, Pa., has recently been opened for traffic. The line is about 1¼ miles long, connecting with the Monongahela Division at a point on the Monongahela River opposite McKeesport, and including the large bridge over the river, which has brought the expense of building the line to over $1,000,000. A temporary station has been built at Third street, McKeesport, to be used until the line has been further extended in and about the city. The trains from McKeesport will run over the bridge to a point on the line of the Pittsburgh, Virginia & Charleston, in Mifflin township, and thence over that line (the Monongahela Division) to Pittsburgh. It is thought that the Pennsylvania will extend the line south along the Youghiogheny River, but the route has not been decided upon, and a recent application of the McKeesport Belt Line for right of way through some of the streets of the town may complicate matters and postpone any extension.

Mexican International.—Press dispatches state that engineers have just been over the survey for the extension from Torreon south to Durango, Mex., 100 miles, revising it; that contracts would soon be let and grading commenced early in the fall. We do not believe there is much foundation in these statements. We have recent authority of one of the officers for stating that the extension has not been abandoned as previously reported, but that from present indications no work is likely to be done for some time, probably not until next year.

Middletown & Cincinnati.—A recent report of this company states that about 10 miles of the road between Middletown and Kings Station, O., has been completed, and the balance of the 14 miles between the towns will be completed by Oct. 1. Several of the stations are now being erected. Apparently the construction of the line is considered a matter of leisure, for about four miles of the track had been laid last January and three miles more in February.

Milwaukee, Lake Shore & Western.—Part of the extension from Wausau southwest to Marshfield, Wis., which was begun in 1890, has been opened for operation, and it is expected to have the entire 40 miles ready for passenger traffic by Sept. 1. The line gives a connection with the Wisconsin Central and also to St. Paul and Minneapolis by the Chicago, St. Paul, Minneapolis & Omaha. Henry & Balch, of Minneapolis, were the contractors. Most of the grading was finished last year, but all of the track has been laid since January and 22 miles of it since July.

Minneapolis, St. Paul & Sault Ste. Marie.—The company has just commenced laying track on the extension from Hankinson, Richland County, northwest to Valley City, N. D., on the Northern Pacific, a distance of about 75 miles. The grading on about 40 miles of this line, to near Sheldon, was completed last year, and a considerable amount of additional grading has been done this year, engaging the time of a small force since May. No track is now being laid on the line between Aberdeen and Bismarck.

Missouri, Kansas & Texas.—Vice-President J. Waldo while in Texas recently was asked what new construction work was contemplated by the company in that state. The reply was not very definite, the most that Col. Waldo would say being: "There are no immediate extensions contemplated in the state. Such extensions as are intended will be made on short lines operated by the company. There are several of these lines, and our intention is to amalgamate them into one corporation in the autumn. A bill was passed at the recent session of the legislature granting the right to incorporate these operated lines into one company under the laws of Texas. When this is done several extensions will be made." "Will the Sherman, Denison & Dallas be extended under the new organization?" "Very probably." The latter is a 10-mile line built in 1890 between Sherman and Denison. It is proposed to extend it south to Dallas, but the Houston & Texas Central already has a line from Denison south to Dallas, so that there is no immediate demand for the line.

Mobile & Girard.—Mr. J. W. Worthington, a member of the firm of Worthington, Elliott & Debardeleben, of Birmingham, Ala., the railroad contractors who are building the Troy extension of this road, states that the suspension of tracklaying south of Troy is only temporary. A large amount of rails received recently were heavier than those being laid on the line. They were returned and work suspended until they could be replaced. As soon as the proper rails are delivered tracklaying will be resumed.

Mobile, Jackson & Kansas City.—A meeting of the stockholders of the company will be held at Mobile, Ala., on Aug. 26 to vote on the question of issuing bonds at the rate of $26,000 per mile and to conclude a contract for the construction and completion of the road.

Murfreesboro.—The contract for completing this road is reported to have been awarded to the Greystone Granite & Construction Co., of Raleigh, N. C. The road will be 6½ miles in length, and is to be completed by September, and will be operated by the Seaboard & Roanoke. It is to extend from Pendleton to a point west of Murfreesboro, N. C. J. H. Winder, of Portsmouth, is interested in the project and was the contractor for part of the grading.

Nashville & Knoxville.—The contract for building the first 17 miles of the extension east of Cookeville, Tenn., to Standing Stone, has been let to the C. C. King & Bros. Construction Co.

New Orleans, Fort Jackson & Grande Isle.—The company has begun the operation of the extension from Socola south along the west bank of the Mississippi River to Zibilieh, La., a distance of 12 miles, and 52½ miles from Algiers, the northern terminus of the line. The branch from Socola Junction to Grand Bayou has also been placed in operation. The track on these lines was laid this year and but little other work has been done in extending the line toward its terminus at Fort Jackson.

New Roads.—The road being built by the Red Cross Mill & Lumber Co., in Shasta County, Cal., is now being graded between Anderson and the Sacramento River, and the bridge across the river is in course of erection. The grading north of the river has been completed for a number of miles to mills of the Shasta Lumber Co. The road is standard gauge, and for present is to be used for the logging business of the builders. It connects at Anderson with the Southern Pacific.

A survey has recently been begun for the Aurora Inner Belt project which it is proposed to build along the eastern line of Aurora, Ind., to connect the Chicago, Burlington & Quincy and the Elgin, Joliet & Eastern.

D. G. Ambler, of Jacksonville, Fla., has let the contract for laying 30 miles of track on the road being built from Archer to Dunnellon, Fla., to Joseph Hawthorn.

Rogers & O'Brien, of Roanoke, Va., have been awarded the contract to build a mile and a half of road from a point on the Norfolk & Western in Roanoke to the works of the Norwick Lock Co. and other factories on the south side of the Roanoke River.

Norfolk & Western.—The branch of this road known as the Roanoke Belt Line is to extend from the main line at the extreme west end of Roanoke, Va., and to a connection with the main line again at the extreme east end of Roanoke. It follows the course of Roanoke River, skirting through the southern part of Roanoke. It is 8½ miles in length, and the line is intended entirely for the accommodation of manufacturing enterprises along Roanoke River. The western portion of this line is now being built. The work is in charge of Charles S. Churchill, Engineer of Maintenance of Way.

Paducah, Tennessee & Alabama.—The contract for the Southern extension from Paris south to Hollow Rock, Tenn., on the Nashville, Chattanooga & Tennessee, is about to be begun at once. The line is about 20 miles long, and will be built by Johnson Bros. & Faught, of Paducah, Ky., who built the main line. The bridges will be erected by M. S. Cartter & Co., of St. Louis, Mo. The contract for the grading has been sublet to the following firms: Welch Bros., C. O. Faught & Co., Brown Bros., Mr. Burks, and Austin & Ebeley. The line is to be ready for operation by Nov. 1.

Pennsylvania.—The contract has been let for building the branch from near Pottsville to mines in Schuylkill County, near Minersville, Pa., a distance of seven miles. Surveys are being made for a number of branches of the Trenton cut-off line which has just been completed between Morrisville and Frazer, Pa. The branches are mostly for freight traffic and probably the first to be built will be one to the blast furnaces of R. Heckscher & Son, near Norristown, about 1½ miles long.

Pittsburgh & Western.—The Ellwood short line, a road three and a half miles long, which was built by this company as a cut-off for its present line at Ellwood, was opened for regular passenger traffic Aug. 9. The line is double track, and includes a long tunnel and has been very expensive to build. Most of the track was laid last year, and work accomplished this year has been principally in completing the tunnel and ballasting the line.

Port Townsend Southern.—Rails for about 35 miles of the proposed extensions of this road were received at Port Townsend, Aug. 5, by a steamer from England. In the fall it is proposed to lay the track from Olympia north to Union City, Wash., the southern terminus of Hood's Canal, a distance of about 25 miles. The work on this extension will be resumed very soon. Besides this line, branches will probably be built from Anacortes to Burrell's Bay, two miles, to complete a connection with Olympia, two and a half miles, and on the Newcastle extension, seven and a half miles.

Quebec Central.—The company has recently received from England about 480 tons of rails to be used on the proposed extension from near Tring station south to Lake Megantic, Que., a distance of about 52 miles. A large amount of 75-lb. rails were received at the same time to be laid on the line between Tring and Beauce Junction, Que., where the road has been recently improved and the grade changed.

Rapid City, Missouri River & St. Paul.—The contract for grading the first 40 miles of this road east of Rapid City, S. D., along Box Elder Creek toward the Cheyenne River was awarded last week to John Chamberlain, of Rapid City. This section includes only light earthwork with easy grades and curvatures. The survey east of the Cheyenne River has been run nearly due east and completed to near the Missouri River at Pierre, the capital of South Dakota. The line to that point will be about 150 miles long. Myron Willsie, of Rapid City, is Chief Engineer.

Richmond & Chesapeake.—Last week the City Council of Richmond, Va., renewed for one year the franchise granted to the company for constructing a tunnel under Eighth street, extending from the western limit of the city to the union station and through the business centre of the city. Shafts have been sunk for the tunnel, but very little work beyond this has been accomplished. It is said that it will cost more than $1,000,000 to complete the work.

Richmond & Danville.—The extension of the North Carolina Midland division to Mocksville, N. C., will probably soon be in operation for the first 18 miles southwest of Winston-Salem to a point beyond Advance in Davie County. The ballasting was completed on this part of the line last week and the track is now being laid to Mocksville, 27 miles beyond Winston-Salem. Only four stations have been established on the line, at Clemmonsville, 12 miles from Winston-Salem; at Advance, 16½ miles; at Cornetza, 21 miles, and at Mocksville, the terminus of the branch.

Rio Grande Southern.—The tracklaying has been commended on the southern end of the line, and about 15 miles of the track has been laid, completing about half the work between Durango, the southern terminus, and Mancos, Col. The principal force now at work is on the line between Ilium and Rico. Nearly all the grading has been finished between these points, except a few cuts and the loop in the line on the east branch of the Dolores River, between Trout Lake and Rico, about 11 miles north of the latter town. This, in fact, is the heaviest work north of Rico. It is expected that it will be completed and the track laid to Trout Lake early in September, and probably the rails will reach Rico 30 days later.

St. Louis, Cape Girardeau & Fort Smith.—A preliminary survey for the extension southwest of Hunter, Mo., has been completed as far as Mammoth Springs, in the northern part of Arkansas, about 45 miles southwest of Hunter. It is stated that the survey will be continued toward Fort Smith, Ark.

St. Louis & Hannibal.—Nearly all the right of way which the company has asked for its extension in Ralls County is said to have been secured. The company proposes to build a line from New London southwest through the county a distance of 20 miles through Centre to Perry, Mo. Another extension is to be built from Oakwood north about two miles to Hannibal, Mo. All the right of way for this second line has not yet been obtained. The county or the towns also to subscribe $300 per mile for repairing the grade already built southwest of New London.

San Antonio & Aransas Pass.—A survey has just been begun for a new line, the principal purpose of which is to give San Antonio a direct route to the mouth of the Brazos River. The survey was commenced at Giddings, Lee County, Tex., on the main line, and will extend to a point near Columbus, where it will cross the Colorado River if sufficient inducement is offered by the town. If the route is not continued across the river it will be run to connect at Eagle Lake.

Savannah, Americus & Montgomery.—The Montgomery extension is now practically completed and the track has been laid within the town limits of Montgomery, Ala. The difficulty now is to decide upon a route into the union station. It is stated that an agreement has been made by which the company will lay its tracks parallel to those of the Western of Alabama. That part of the extension east of the Chattanooga River is in operation, and as soon as the arrangements for entering the union station at Montgomery are completed and a small amount of work near Hurtsboro is finished, the entire extension, 95 miles long, will be opened for traffic

Silver Springs & Western.—H. L. Anderson, D. W. Davis and F. G. Moorehead, of Ocala, Fla., have incorporated this company with a capital stock of $100,000 for the construction of a road from Ocala to Silver Springs, and from Ocala to Dunnellon, with a branch to Archer, Fla.

Sinnemahoning Valley.—It is stated that the directors have decided upon an extension from the present terminus at Costello west through Tioga County to Ansonia, connecting at that point with the Pine Creek division of the Fall Brook Coal Co.'s railroad lines. It is not settled when the construction work will begin. The road is owned by Frank H. Goodyear, of Buffalo, and the extension will be built to reach the timber lands owned by him.

Snake River, National Park & Pacific.—The surveys are to be commenced in a few weeks for this road, recently chartered in Idiaho. The line is projected by the Idaho Falls and Wyoming Coal & Mining Co., and is to extend from Idaho Falls, Bingham County, to coal fields in Uinta County, Wy., on the Grosventre River, about 35 miles from its junction with the Snake River. A branch is proposed from a point about 100 miles from Idaho Falls to Jackson's Lake, in Uinta County. The entire line will be about 160 miles long. The principal office is to be at Idaho Falls, Idaho.

Soque & Pallulah.—A bill has been introduced in the Georgia Legislature to charter this company, with headquarters at Soque, Ala. The incorporators are M. C. Kiser, E. P. Howell and H. L. Culberson, of Atlanta.

Springfield.—The survey for this Vermont road is now well under way. The road is to extend from Cavindish Station, on the Central Vermont, to Springfield, near Perkinsville, in Windsor County, Vermont, West of the Connecticut River. The survey and construction of the line will be under the direction of Col. George A. Ayer, of Perkinsville.

Texarkana & Fort Smith.—The bridge over the Red River north of Texarkana, Tex., was finished last week and the track is now being laid north of the river in Arkansas. The road is now completed for 30 miles north of Texarkana to Little River, Ark., and 30 miles additional is under contract. The proposed line is from Texarkana to Fort Smith, Ark., 198 miles. Connection is made at Texarkana with the St. Louis, Iron Mountain & Southern, the St. Louis Southwestern, the Texas & Pacific, the Texarkana & Shreveport.

Toledo & Chicago Bee Line.—George G. Hadley, of 305 Summit street, Toledo, O., one of the directors of this project, gave the following information to a reporter last week: "We have a force of men all along the line. At Lyons, Pioneer, Matamora and other places they are surveying, and we expect that the engineering will be completed within a short time now. As soon as the engineers are through with their work on the line from Toledo to Chicago, they will be put on the Detroit branch, which it is expected will be completed by fall. The road will be completed to the Indiana state line, which is about 70 miles from Toledo, by Jan. 1, and the idea now is that the entire line can be ready for operations by next July, but I think it more probable that it will not be completed before next fall." The officers of the Lake Shore & Michigan Southern, the railroad most interested, don't think it will be completed at all.

Toledo & Ohio Northern.—The directors of the company at a meeting last week voted to proceed at once with the construction of this road through northwestern Ohio and northern Indiana. The company was reorganized last year by the Lake Shore & Michigan Southern to complete a new Toledo and Chicago line by building from Fayette, Ind., about 40 miles west of Toledo, to Chesterton, near Chicago, a distance of 155 miles. The line which it is now proposed to build is from Fayette, through Steuben and La Grange counties in Indiana, to Shipshewana, Ind., near Elkhart. The distance is about 85 miles. Probably the speed at which the line will be built will depend largely upon the avidity with which the townships vote the bonuses asked by the Lake Shore & Michigan Southern, and probably, also, the activity shown by that company will depend largely on the movements of the Toledo & Chicago Bee Line project of Donald McLean and G. G. Hadley, of Toledo. When the latter organized a company last fall to build a new line between Toledo and Chicago, and canvassed for township bonds, the Lake Shore followed. This was too great a demand upon the liberality and enterprise of the towns. Then when the new project was given up, the Lake Shore also followed. Both projects have been kept very quiet until a few weeks ago, when the Toledo & Chicago enlisted the energy of the promoter of the Pacific Shore Line.

Unaka & Wolachucky.—An election will be held at Morristown, Tenn., on Aug. 22, to consider a proposition to issue $25,000 in bonds to aid in the construction of this road, which is projected from Morristown to a point in the Cranberry iron district.

Utah & Wyoming.—Articles of incorporation were filed in Utah last week. The object is to build a road from a point on South Salt Lake, near Garfield Beach, northeasterly to the Wyoming line, 91 miles. The capital stock is $100,000 and the route is from Garfield Beach to Salt Lake City, and thence through Emigration Cañon and northeast across the divide to Silver Creek Valley, to Wanship, in Summit County, thence down the Weber to Coalville and up Chalk Creek to the Wyoming line. The actual cost of construction is put at $18,000 per mile.

Velasco Terminal.—A party of engineers began the survey for this line last week at Velasco, Tex., at the mouth of Brazos River. They are to run a line northwest on the north bank of Brazos River to Chenango, on the Columbia branch of the International & Great Northern, about 20 miles. It is stated that most of the construction material necessary for this part of the line has been purchased, and some of it has already arrived at Velasco. G. Wilke, of Chicago, is largely interested in the project. His temporary headquarters are at Velasco.

Waco, Brazos Valley & Pacific.—This road came to grief in Texas last week, as many other lines in the same state have before it. This particular project was fairly ambitious, and was to unite by rail Henrietta and Waco, and more widely separated towns. The only work ever done beyond surveying was a few miles of grading between Mineral Wells and Millap Station, in Palo Alto County. Last week the Waco State Bank attached this work and some construction material in Waco. When work was suspended an assignment was made to the bank, and the attachment was issued to protect the bank against certain claims of W. H. Ross and G. B. Gurley, two of the projectors.

West Virginia Central & Pittsburgh.—The preliminary survey for the line from Cumberland to Hagerstown, Md., which has been in progress for the last three months, was completed to the latter point early last week. The line will be 78 miles long, by the route surveyed, which will necessitate the construction of two tunnels. The grades are said to be easier than it was anticipated would be found. The surveying party was in charge of George A. Corvell.

West Virginia & Pittsburgh.—The surveyors who have been engaged on the extension south of the Ganley River, near Sutton, W. Va., to a connection with the Chesapeake & Ohio in the southeastern part of the state, have decided upon Marlinton, on the Greenbrier River, as the junction point for the two lines. It is reported that the officers of both roads have accepted this report. The line to be built by this company will be 35 miles long from the Ganley River, and the line of the Chesapeake & Ohio will be 25 miles long, extending from a point on its Warm Springs branch, near Jackson River. Marlinton is near Huntersville and Pocahontas, Va., being about six miles from the latter town. It is expected that the connection will be made next summer.

Winona & Southwestern.—The ballasting and track laying on the extension to Osage, Ia., was completed last week, and the first passenger train to run over the entire road reached that city Aug. 6. This completes the line for a distance of 116 miles from the Mississippi River at Winona, about 15 miles of the line being in Iowa southwest of Leroy. This part of the line has been built under the charter of the Winona, Osage & Southwestern.

GENERAL RAILROAD NEWS.

Arkansas Midland.—The purchase of the Helena, Indian Bay & Brinkly road by this company has been consummated. The company had held an option on the property for some weeks. The road extends from Brinkly to a point eight miles below Pine City, Ark., and is 37 miles in length. The road will be continued to Indian Bay, and will give the Memphis & Little Rock and White & Black River Valley roads valuable southern connections.

Charleston, Cincinnati & Chicago.—The United States Circuit Court at Knoxville, Tenn., has refused to grant the motion of certain bondholders to remove the case of McDonald, Shea & Co., contractors, against the railroad, to the United States Court, and remanded it to the State Court at Jonesboro, Tenn. Certain bondholders of Philadelphia, Boston and New York have sought to remove the case to the United States Court. The order of the court means the dismemberment of the road, and that the part in Tennessee will be sold.

Chicago & Alton.—The report of the earnings of the company for June shows an increase of $65,000 for the same period last year. The earnings for July show an increase of $111,000.

Chicago, Kansas & Nebraska.—Two deeds have been filed for record at Beatrice, Neb., in the office of the Register of Deeds, wherein the company conveys to the Chicago, Rock Island & Pacific all its property, rights and franchises. The consideration named is $25,222,000.

Chicago, Kansas City & Texas.—Judge Phillips, of the United States District Court, in Kansas City, on Aug 9, appointed W. B. Withers and Walton H. Holmes joint receivers for the Kansas City Bridge & Terminal Co. and the Chicago, Kansas City & Texas Railroad. The receivers were appointed on application of the Central Trust Co. of New York, trustees for the first mortgage bond holders. These two enterprises were projects of W. E Winner, who failed recently.

Cobourg, Blairton & Marmora.—This company is now operated by the Grand Trunk between Cobourgand Harwood, Ont., 14 miles, as the Harwood branch of that line, under a recent lease. Previous to the lease the road had not been operated for about two years. It was formerly called the Cobourg, Peterborough & Marmora. That part of the original line between Peterborough and Harwood was abandoned several years ago, and another section sold to the Grand Trunk.

Mobile & Ohio.—The annual report for the year ending June 30 shows net earnings of $1,215,712, against $1,070,918 a year ago, and a surplus after charges of $157,448, against $111,589. The company spent $451,980 for equipment, construction and car trust, leaving the net surplus at the end of the year $22,505.

New York Central & Hudson River.—The gross earnings of the company and its leased lines for June, 1891, were $3,571,802, as compared with $3,007,097 in June, 1890, an increase of $564,705. The gross earnings for July, 1891, were $3,713,430, as compared with earnings of $3,004,827 in 1890, an increase of $708,603. The statements for 1891 include earnings of the Rome, Watertown & Ogdensburg, which amounted to $354,707 in June and $361,480 in July. For the three months ending June 30, the gross earnings were $10,387,249 in 1891, and $9,158,170 in 1890, an increase of $1,229,079. For the year to June 30, 1891, the gross earnings were $37,902,115, and for the previous year $37,008,404, an increase of $893,711.

San Francisco & North Pacific.—The company reports for the year ending June 30 gross earnings of $832,648, an increase of $77,354, as compared with the previous fiscal year; operating expenses, $517,852, an increase of $16,069; net earnings, $314,795, an increase of $61,285; interest and sinking fund, $231,633, an increase of $3,854, leaving a surplus of $56,551, an increase of $54,820.

Southern Pacific.—The gross earnings of the Atlantic system for June were $932,626, a decrease of $31,334 as compared with the same month of last year, and net earnings were $180,179, a decrease of $49,412. For the six months ending June 30 the gross earnings were $5,933,896, a decrease of $45,082 as compared with the corresponding period of last year, and net earnings, $1,281,668, a decrease of $336,200.

Texas Trunk.—Some change of control of this line has been recently made, or such an arrangement is likely soon to be effected. Press dispatches credit C. P. Huntington with having concluded the purchase of the road, but we have the best authority for announcing that Mr. Huntington is not interested in the line, as we also have for stating that some change is to be made in the interest that has had control of the road. The line is not in the best of condition, and has always had a hard struggle to earn its expenses. It is 49 miles long, extending from Dallas east to Kemp, Tex.

Toledo & Ohio Central.—The net earnings of the company for the year ending June 30 were $468,015, against $545,639 a year ago. The surplus, after all charges and dividends, was $98,368, against $271,450 the previous year.

Union Pacific.—Statements circulated last week that the company had been unable to pay a large amount of the floating indebtedness which had been called, caused a decline in the quotations of the stock from 42 to 35⅞ between Thursday and Tuesday. It was reported that heavy loans had been called, and that the company was unable to secure extensions, either on account of the decline in the value of collaterals or on account of the general tightness of the money market, or for both reasons, and that the directors had to advance money to the company to tide over immediate demands. President Dillon said: "There is no crisis in the affairs of the company, as alleged. All loans which have been called have been taken care of. We are effecting considerable saving in operating expenses. Any talk of a receiver for the road is simply for the purpose of depressing the market price of the stock." Russell Sage said: "Mr. Gould is at present the largest stockIder in the company, his interest amounting to over $3,500,000. He declares that he will re-invest his income as received in the property. The floating debt has been reduced over $2,000,000 since the present administration took hold." A day or two following the publication of these statements, it was announced that a syndicate had been formed which had agreed to guarantee to provide the road with all the money it needs to take care of its floating debt during the next three years. Comprised in the syndicate are: Messrs. Gould, Sage, Dillon, Ames, Dexter, Atkins and Dodge. The status of this syndicate seems to be in much doubt. It is stated that it has been found impracticable to

carry out this arrangement, and that the directors have proposed a new plan for the relief of the company and to carry the floating indebtedness. The new plan drawn up is something similar to the scheme adopted by the Atchison company two years ago. The large creditors of the company agree to extend their maturing obligations for periods of from two to three years, the eventual payment being guaranteed by a new syndicate, which will include several directors of the company.

The following is the preliminary statement of the earnings of the system for June:

	1891.	1890.	Inc. or Dec.	
Mileage	7,688	7,548	I	120
Gross earn	$3,447,786	$3,793 862	D	$346,076
Oper. expenses	2,320,320	2,277,157	I	43,163
Net earn	$1,127,466	$1,516,705	D	$689,239
Jan 1 to June 30:				
Mileage	7,668	7,555	I	113
Gross earn	$18,915,8 5	$19,901,749	D	$985,944
Oper. expenses	13.149,082	14,003.173	D	854,141
Net earn	$5,766,773	$5,898,576	D	$131,803

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, Aug. 2, 1891.

The Western Passenger Asscciation has had under consideration the question of the limitation of harvest excursion rates recently authorized. The association authorized two of these excursions with a fare of one and one third for the round trip. The Alton not being likely to secure its share of this business on account of the trouble with the Eastern lines, promptly announced that it would run three excursions, making a fare-one-way rate. The Atchison thereupon announced its intention to meet the rate of the Alton to competitive territory, and the same course is open to the other Kansas City lines. Now the Nebraska lines fear that they will be accused of discriminating against their territory if they do not extend the rate up the Missouri River. To do this will demoralize all western rates for the next two months, and the lines are trying to solve the problem whether they will keep rates at the association basis in territory not directly affected by the Alton cut, or will carry the cut throughout all the territory.

The question of the relative rates on salt has been before the associations time and again, and has recently once more come up, this time before the Commissioners of the Western Traffic Association on an appeal of the Chicago, Burlington & Quincy to restore the westbound rates in effect prior to October, 1890.

The decision of the Commissioners, which is quite long, is in substance as follows:

This application is in effect a proposition to readjust the differentials on salt to Missouri River points and points in the State of Nebraska by restoring the westbound rates which were in effect prior to October, 1890. The reasons advanced in support of the proposition arise from the competition between salt produced in the State of Kansas on the one hand and salt produced in Michigan and New York on the other. It is claimed that, under the present adjustment of rates, the Burlington line, which was a heavy carrier of Michigan salt from Chicago, westbound, finds itself substantially excluded from the salt traffic at the points named, the market being supplied by salt from Kansas points. The history of the present ajustment of salt rates is substantially as follows: Originally salt required for use on the Missouri River and beyond was carried from Michigan and New York and furnished a large and valuable traffic to the Chicago lines—there being a heavy consumption in the packing houses as well as through the general use of the commodity. Westbound rates were adjusted through Chicago and St. Louis in such a manner as to equalize the routes. Subsequently the manufacture of salt was commenced in Kansas, at Hutchinson and other points in that vicinity. As their production increased the owners of the Kansas salt works desired to sell their product at points more and more remote, and the roads leading east from the Kansas salt-producing points insisted that they were entitled to the near-by markets. So far as the Kansas salt was introduced it had the effect of driving out the Michigan salt, and the struggle between the hostile interests became severe. The carriers from the East and from the West made rates intended to protect the traffic from their respective sections, and the competition resulted in exceedingly low tariffs and general demoralization. During 1888 the subject attracted much attention and many efforts were made to agree upon a settlement of a contest which was confessedly injurious to all interests. By reason of the determination evinced by the carriers from both directions to maintain the positions which they had respectively assumed concerning their right to control the markets named, no agreement could be reached, and after many ineffectual efforts to arrive at a proper adjustment, the subject was referred to Chairman Walker for arbitration. His award was intended to give the Kansas producers control of the market at Kansas City, Atchison, Leavenworth and St. Joseph, to give the Michigan shippers the advantage of a rate from Chicago to Nebraska City, Omaha and Sioux City 1 cent, 1½ and 3 cents less than the rate from Kansas points, and to put Michigan and Kansas salt works on an equality in the State of Nebraska west of the Missouri River.

This award was not satisfactory to some of the Kansas lines, which insisted that they were entitled to control the markets at Nebraska City and Omaha, and it was not made effective. The rate situation remained in the same disturbed and unsatisfactory condition until the following summer, when a conference, held on Sept. 2, resulted in the establishment of rates. The effect of the changes thus arrived at from the basis of Chairman Walker's award was to put the rates from Hutchinson and from Chicago upon an equality at all points in Nebraska on salt in barrels, and to give the Kansas lines an advantage of 2 cents in the rates to Nebraska City, Omaha and Council Bluffs in bulk salt. The Burlington Company shows that the operation of the present tariffs at points on its line in Nebraska west to the Missouri River has been to diminish its ability to supply the numerous junction points where rates from the Kansas salt works are the same as from Chicago. This is perhaps a natural result of an equality of rates from the two basing points, and may perhaps be further affected by the fact that the Michigan salt producers have established a permanent price for salt which they firmly maintain. It does not appear to the Commissioners that rates from Kansas to interior Nebraska points could justly be made upon a higher basis than rates from Chicago to the same points, and that the Burlington having an equality of rates at such points, obtains all the protection which it can properly expect to receive. The effect of the present adjustment in throwing the control of the markets at Nebraska City and Omaha into the hands of the Kansas lines is obviously largely if not altogether attributable to the rate of 13 cents on bulk salt allowed them to those points as against the rate of 15 cents established on all salt from Chicago. The consideration suggested, as existing in support of the claim that the markets at Omaha and Nebraska City may be fairly claimed by the Chicago lines, are not without force. The circumstances are such that the relative expense of transportation seems in favor of Chicago, and the situation of those markets upon the great lines leading east and west between Nebraska and eastern points is entitled to weight. The rate of 13 cents referred to was not, however, made a subject of argument when the matter was recently heard before the Commissioners; in fact it was apparently overlooked. The Commissioners would not feel justified in deciding that this differential in favor of the Kansas roads was unjust, without hearing both parties in respect thereto. They simply take this occasion to point out the fact that an adjustment was consented to by the Chicago lines in 1890, which had the effect of abolishing the slight differential against the Kansas lines awarded by Chairman Walker at Nebraska City and Omaha, and conceding a differential of two cents in their favor upon salt in bulk.

The Commissioners see no reason for thinking the present adjustment unfair at Southwestern Missouri River points from St. Joseph to Kansas City, and a reduction from Chicago limited to Omaha and Nebraska City would necessarily be applied from St. Louis and other Mississippi River Points, and, as the rates are made in that territory, would perforce be carried through Kansas City by some of the Omaha lines. It is obvious that if it shall be found that a correction may properly be made at Nebraska City and Omaha in the respects stated, or some of them, the result should be brought about, if possible, by an advance in the rates from Kansas points to the points named. This, however, is not contemplated by the present application and could not properly be ordered by the Commissioners as the matter is now presented.

The Commissioners of the Western Traffic Association are in session this week hearing various appeals and considering matters before them.

The Atchison has notified its St. Louis connection, the Jacksonville Southeastern, that they will not be a party to rate manipulations on the part of that line. The lines agreed that the sale of tickets to the Grand Army Encampment at Detroit should cease on Aug. 3, but the Southeastern continued selling tickets, or rather tickets of their issue were plenty on the market, and the attention of the Atchison being called to the matter they promptly bulletined the tickets and notified the Southeastern that they would not be honored on the Atchison trains.

The Commissioners of the Western Traffic Association have ordered the rates on pig iron from Fond du Lac reduced to $1.15 to Chicago and 75 cents to Milwaukee, effective Aug. 15.

The Commissioners of the Western Traffic Association have re-heard the matter of rates on iron ore from Michigan and Wisconsin points, on the application of the Milwaukee & Northern, which claims that the recent decision of the Commissioners awarding the Northwestern a reduction of 5 cents per ton to Escanaba places them at a disadvantage, and asks for a general reduction of 15 cents. In their decision the Commissioners review their former decision and proceed to deny the application for a further reduction. They say:

It is clear that the change of 5 cents in the relation of the all-rail to the rail and lake rate has been accomplished as above described, and it also seems to be satisfactorily established that the lake rate Escanaba to Chicago has been reduced this season in favor of the principal shipper 10 cents below the figures of last year, making an increase of 15 cents in the disparity which existed in 1890 between the rates all-rail and by rail and lake. It is also true, as stated, that the situation of the Milwaukee & Northern, being the short rail line to Chicago, and having no line to the lake ports, makes it especially desirable to that company to encourage the all-rail traffic. On the other hand the situation of the Milwaukee & Northern in the mining district is such that it has been and is less interested than any other line in the rates in question. Previous to the present year its tonnage has been slight. Considerable increase is now apparent, which, while it is said to result from more advantageous connections in the mining district, certainly does not show any loss of traffic arising from the increased disparity complained of. Moreover, it appears that the percentage of the total shipments by rail, as compared with the total shipments by rail and lake, are expected to be larger in 1891 than in 1890. About one-half the total movement of ore by rail to Chicago comes from the Gogebic range, and the lines interested in its transportation, which certainly are entitled to great consideration in this matter, strongly desire the maintenance of the existing tariffs through the present season. Considerable stress is laid upon the importance of encouraging the supply of ore to industries not located directly upon the lake front, but there is a failure to clearly show that a change in the rate of five cents or even 15 cents for the remainder of the season would control the policy of the owners of the industries referred to in respect to the management of their different plants. The lake rates during the present season have ruled surprisingly low but are now advancing, and the condition of the iron industry generally seems somewhat analogous thereto. As was said in Circular 21, the rates in question considered by themselves are undoubtedly reasonable to the shippers, and in fact, considering the circumstances attending the transportation, are suprisingly low. The Commissioners still feel that they would not be warranted in reducing them unless in answer to a request united in by all or nearly all the interested carriers, or in consideration of circumstances clearly controlling and permanent. If the existing conditions are continued into the winter and if the competitive output of iron in the Southern States is further relatively increased, it is not impossible that some general readjustment involving further concessions will be required, but in the face of the strong opposition developed, the Commissioners believe their former disposition of the case should be adhered to.

The following communication has been sent the "Soo" line by Chairman Finley on behalf of all the Northwestern lines: "We are advised that your line is selling tickets at St. Paul and Minneapolis for the Grand Army of the Republic Encampment, good for return via Chicago, on payment of $1.50 additional. No agency has been granted to your company to sell tickets of this character, and we will not be in a position to honor them."

Chairman Finley has declined to authorize the Chicago, St. Paul & Kansas City to transfer passengers and baggage free between their depot and the Union Depot at Kansas City.

Traffic Notes.

By agreement between the Texas railroads free passes issued on traffic account are suspended.

The Queen & Crescent and the L. & N. announce harvest excursions to all Florida points for one fare the round trip.

Chairman Blanchard has issued a circular, naming rates on pig iron, etc., to go into effect Sept. 1, viz.: Buffalo & Pittsburgh to Chicago, $2.50; to east St. Louis, $3; Mahoning Valley, Chenango, etc., $2.20 and $2.50.

The Trunk Line Passenger Commission has decided that conductors on the trunk lines need not honor the tickets of the Duluth, South Shore & Atlantic unless that road will agree to raise its St. Paul-New York rate to the schedule.

A very heavy percentage of the wool clip of the year comes east by the lakes. On the 10th 966 tons were shipped by lake, against 16½ by the railroads. All of the Western wool will be in transit on the lakes before rates are advanced Aug. 20.

Lower rates for seats in parlor cars have been put out by the Big Four as follows: For 135 miles or less, 25 cents; more than 135 and less than 250, 50 cents; 250, and not more than 350, 75 cents; for all distances greater than 350 miles the rate will be $1.

It was reported that the Ogdensburg Transit Co. would reduce westbound lake and rail rates from Boston to Milwaukee and Chicago on business destined for points beyond. Later advices say that the company now declares that it will advance rates on Aug. 20 as agreed.

The Georgia Southern & Florida will put in effect a reduced passenger rate to Southern points. The schedule is reported to be for 50 miles 3 cents, for the second 50 miles 2¾ cents, for the third 2½ cents, for the fourth 2¼ cents and for the fifth 50 miles and beyond, 2 cents a mile.

The Board of Chairmen having control of the freight traffic passing through Kansas City and the Southwestern Missouri River gateways have issued an order requiring the Atchison to divert 100 carloads of freight to the Rock Island and 150 carloads to the Wabash, at the same time relieving the Atchison from further delivery to the Alton.

Rates on grain for export through Montreal will be advanced Aug. 17, according to an agreement between the Canadian Pacific and the Grand Trunk. From points now taking a 10-cent. rate the new rate will be 12½ cents. The 12½-cent rate will be advanced to 14 and the 14-cent rate to 16. These are exclusive of Montreal elevator and floating charges. The reduction will be in the form of a rebate after exportation.

Officers of the Great Northern estimate that the volume of grain to be handled this year is over 20,000,000 bushels more than last year. Its officers are instructed to be prepared to handle 12,000,000 bushels more than last year, that is an aggregate of 28,000,000. Other Northwestern roads figure on a proportionate increase. It is reported that the Pennsylvania lines have given notice that they cannot receive grain for Baltimore, owing to the crowded condition of their yards.

The Grand Army at Detroit.

During the recent encampment of the Grand Army of the Republic at Detroit, the Michigan Central handled 660 extra cars and 33,000 passengers. A special yard was arranged into which the extra trains were run the moment they were emptied. One hundred and five extra cars of the Detroit, Lansing & Northern were also handled. Freight business was somewhat interfered with. The Wabash handled 200 extra cars and 12,300 extra people; the Lake Shore & Michigan Southern handled 200 cars and 20,000 people; the Detroit, Grand Haven & Milwaukee 150 cars, and the Grand Trunk 75. The local accounts say that all of this extra work was done with the greatest smoothness.

Barb Wire Freight.

J. W. Gates, General Manager of the Columbia Patent Co., announces the appointment of C. L. Dean as General Freight Agent of the Columbia Patent Co. He will hereafter handle the tonnage of the following wire mills: John A. Roebling's Sons'Co., Trenton, N. J.; Iowa Barb Wire Co., Allentown, Pa; Braddock Wire Co., Pittsburgh, Pa.; Oliver & Roberts Wire Co., Pittsburgh, Pa.; Cleveland Rolling Mill Co., Cleveland, O.; Cincinnati Barb Wire Fence Co., Cincinnati, O.; Baker Wire Co., Lockport, Ill.; Lambert & Bishop Wire Fence Co., Joliet, Ill.; St. Louis Wire Mill Co., St. Louis, Mo.; Continental Wire Co., St. Louis, Mo.; Consolidated Barb Wire Co., Lawrence, Kan.; Omaha Barb Wire Works, Omaha, Neb.; California Wire Works, San Francisco, Cal.

These mills manufacture and sell about 85 per cent. of the entire tonnage of barbed fence wire manufactured in the United States and about 75 per cent. of the barbed fence wire manufactured in the world. These mills also manufacture many other kindred articles, such as plain wire, wire nails and wire rods. The estimated tonnage of the various mills which are interested in this company will amount to at least 500,000 tons per annum.—*Chicago Times.*

Rates for the World's Fair.

The Executive Committee of the World's Columbian Exposition has adopted resolutions requesting the railroads to make half rates in both directions on exhibits to the fair.

Wichita Live Stock Rates.

The suit brought by the Wichita Live Stock Exchange against the Atchison, Missouri Pacific, Rock Island and the San Francisco to enjoin them from putting into effect a new rate on live stock, resulted in a victory for the roads. The Wichita Exchange tried to show that the new rate discriminated against Wichita in favor of Kansas City, and that it was in excess of the rate recently ordered by the State Board of Railroad Commissioners, in both of which endeavors it failed. The temporary injunction was therefore denied.

Nebraska Rates.

The State Board of Transportation will take evidence on the question of rates in that state on the following dates: At Lincoln Aug. 13, at Kearney Aug. 19 and at Norfolk Aug. 25.

Tennessee River Freight.

A mass meeting was held at the Opera House, Chattanooga, Aug. 11, to discuss river navigation. It is expected that $100,000 will be raised to equip a steamboat line on the Tennessee River through Muscle Shoals Canal to St. Louis. It is hoped that the proposed line will save Chattanooga $1,000,000 annually in freight rates. Last year the Chattanooga boats were not a success.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Aug. 6 amounted to 47,675 tons, against 44,614 tons during the preceding week, an increase of 3,061 tons, and against 58,945 tons during the corresponding week of 1890, a decrease of 11,270 tons. The lake lines carried 114,212 tons, against 83,601 tons during the preceding week, an increase of 30,611 tons. The proportions carried by each road were:

	Wk. to Aug. 6.		Wk. to July 30.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central	5,688	11.9	4,500	14.6
Wabash	3,017	6.3	3,100	7.0
Lake Shore & Michigan South.	7,808	16.4	5,844	13.1
Pitts., Ft. Wayne & Chicago	5,496	11.5	6,275	14.1
Pitts., Cin., Chicago & St. L	5,942	12 5	5,234	11.7
Baltimore & Ohio	2,402	5.0	3,096	6.9
Chicago & Grand Trunk	5,580	11.7	4,767	10.7
New York, Chic. & St. Louis	5,948	12.5	5,016	11.2
Chicago & Erie	5,794	12.2	4,782	10.7
Total	47,675	100.0	44,614	100.0

Of the above shipments, 2,094 tons were flour, 15,622 tons grain, 1,435 tons millstuff, 5,107 tons cured meats, 7,739 tons dressed beef, 1,898 tons butter, 1,355 tons hides, 617 tons wool and 6,232 tons lumber. The three Vanderbilt lines carried 40.8 per cent., while the two Pennsylvania lines carried but 24.0 per cent. The lake lines carried 114,212 tons, against 83,601 tons during the preceding week, an increase of 30,611.